Appendix to the Responses to Comments

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This appendix contains the following information:

- The National Marine Fisheries Service's adoption of the final conference opinion as its biological opinion for the threatened Central Valley steelhead;

- The National Marine Fisheries Service's Final Biological Opinion Concerning the Effects of the Proposed Construction of the Delta Wetlands Project on the Threatened Central Valley Spring-Run Chinook Salmon, Its Habitat, and Critical Habitat of the Central Valley Steelhead;

- Protest Dismissal Agreement Between Delta Wetlands Properties and East Bay Municipal Utility District;

- Agreement to Resolve Certain Delta Wetlands Permit Issues Between Delta Wetlands Properties and California Urban Water Agencies; and

- Protest Dismissal Agreement Between Contra Costa Water District and Delta Wetlands Properties.

National Marine Fisheries Service Biological Opinion for the Central Valley Steelhead

MAY 2 2 2000

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

May 19, 2000

In response reply to:
F-SA-00-04:MCV

Mr. Michael Finan
Chief, Delta Office
U.S. Army Corps of Engineers, Regulatory Branch
1325 J Street
Sacramento, California 95814-2922

Dear Mr. Finan:

This is in response to your letters of July 20, 1999 and November 29, 1999 requesting the adoption of the National Marine Fisheries Service's (NMFS) June 26, 1997 conference opinion for the Central Valley Evolutionarily Significant Unit (ESU) steelhead (*Oncorhynchus mykiss*)(Central Valley steelhead) as its final biological opinion for the proposed Delta Wetlands project (PN 190109804). In addition, your letter requests formal Section 7 consultation for the recently listed spring-run chinook salmon (*O. tshawytscha*), and concurrent consultation for Essential Fish Habitat for the Central Valley steelhead, spring-run chinook salmon, and the winter-run chinook salmon.

On August 9, 1996, NMFS proposed to list the Central Valley steelhead as endangered under the Endangered Species Act (ESA). On March 19, 1998 NMFS published in the **Federal Register** its final determination to list the Central Valley steelhead as threatened, effective May 18, 1998. On February 16, 2000 NMFS published its final rule for the designation of Critical Habitat for the Central Valley steelhead, effective March 17, 2000.

While the Central Valley steelhead was under consideration for listing under the ESA, NMFS issued a conference opinion to the U.S. Army Corps of Engineers (USACE) dated June 26, 1997, for the Delta Wetlands project. This conference opinion concluded that the proposed construction and operation of the Delta Wetlands water storage project was not likely to jeopardize the continued existence of the Central Valley steelhead. Should the Central Valley steelhead be listed subsequent to this opinion, Part VII of this opinion advised the USACE to request in writing that NMFS adopt the conference opinion as its final biological opinion. If neither the project activities considered in the conference opinion nor the information on which the conference opinion was based had changed, NMFS would adopt the conference opinion as its biological opinion.

Based on Ms. Barbara A. Brenner's (Ellison & Schneider Attorneys at Law) August 6, 1999 declaration that the Delta Wetlands project activities have not changed, and NMFS review of the information on which the final conference opinion was based, NMFS adopts the final conference opinion as its biological opinion for the threatened Central Valley steelhead. In addition, NMFS concludes that based on the analysis of effects in the conference opinion, this action is not likely to result in the adverse modification of Central Valley steelhead critical habitat.

Your letter also requested formal Section 7 consultation for Central Valley spring-run chinook salmon. The spring-run chinook salmon was proposed for listing March 9, 1998, and subsequently listed as threatened on September 16, 1999. The Delta Wetlands project lies within the critical habitat for the spring-run chinook salmon designated February 16, 2000. As requested, NMFS will prepare a biological opinion for the spring-run chinook salmon. We anticipate that consultation can be completed using the existing information contained within our files, however, we may request additional information if needed to complete consultation.

Essential Fish Habitat (EFH) Conservation Recommendations are required by the Magnuson-Stevens Fishery Conservation and Management Act, as amended (16 U.S.C. 1801 et seq.) to protect important marine and anadromous fish habitat. While the Pacific Fisheries Management Council has recommended an EFH identification for the Pacific salmon fishery it has yet to be approved by the Secretary of Commerce, however, if approval occurs before the Delta Wetlands project is finalized, a detailed response in writing will be necessary, describing the measures proposed for avoiding, mitigating, or offsetting the impacts of the project on EFH. To assist you in an analysis of aquatic areas that may be identified as EFH for salmon within the project area, we will attach EFH Conservation Recommendations to our biological opinion for Central Valley spring-run chinook salmon.

We appreciate your continued cooperation in the conservation of listed species and their habitat, and look forward to working with you and your staff in the future. If you have any questions regarding this response, please contact Ms. Martha Volkoff in our Sacramento Area Office (650 Capitol Mall, Suite 6070, Sacramento, CA 95814). Ms. Volkoff may be reached by telephone at (916) 498-6488.

Sincerely,

for Rodney McInnis
Acting Regional Administrator

cc: Barbara Brenner, Ellison & Schneider Attorneys at Law
Cay Goude, USFWS Sacramento
NMFS-PRD, Long Beach, CA
Sacramento Admin file

National Marine Fisheries Service Biological Opinion for the Central Valley Spring-Run Chinook Salmon

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

AUG 29 2000

IN RESPONSE REFER TO:
F-SA-00-5:MCV

Mr. Michael Finan
Chief, Delta Office
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Dear Mr. Finan:

Please find the enclosed National Marine Fisheries Service's (NMFS) final biological opinion concerning the effects of the proposed construction and operation of the Delta Wetlands (DW) project (Project Number 190109804) on the threatened Central Valley spring-run chinook salmon (*Oncorhynchus tshawtscha*) (spring-run chinook salmon), its critical habitat, and critical habitat of the Central Valley steelhead (*O. mykiss*) (steelhead).

The biological opinion concludes that the Corps of Engineers' issuance of a Department of Army permit for the DW project is not likely to jeopardize the continued existence of the spring-run chinook salmon, nor result in the adverse modification of spring-run chinook salmon critical habitat or steelhead critical habitat. Because NMFS believes there will be some incidental take of spring-run chinook salmon as a result of project operations, an incidental take statement is also attached to the biological opinion. This take statement includes several reasonable and prudent measures that NMFS believes are necessary and appropriate to reduce, minimize, and monitor project impacts. Terms and conditions to implement the reasonable and prudent measures are presented in the take statement and must be adhered to in order for take incidental to this project to be authorized.

As with the prior biological opinion for the Sacramento winter-run chinook salmon (*O. tshawtscha*) and Central Valley steelhead, this incidental take statement does not provide incidental take authorization for the re-diversion of DW discharges by other parties, including the Delta pumping plants operated by the Central Valley Project (CVP) or the State Water Project (SWP). The operations of these facilities and the related incidental take of listed salmonids are covered under the CVP-OCAP biological opinions issued by NMFS to the Bureau of Reclamation. Should changes in export operations of the CVP or SWP increase as a result of DW operation, NMFS anticipates that the Bureau of Reclamation and the Department of Water Resources will confer with our office on these changes in their project's operation.

Finally, the biological opinion also provides several advisory conservation recommendations for spring-run chinook salmon that include the use of levee maintenance procedures that will increase or enhance the quantity and quality of riparian habitat, and studies designed to explore juvenile salmonid rearing and migratory behaviors in the Sacramento-San Joaquin Delta.

This document also transmits NMFS' tentative essential fish habitat (EFH) Conservation Recommendations for chinook salmon (Oncorhynchus tshawytscha) as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) as amended (16 U.S.C. 1801 et seq.). While EFH designations for salmon have yet to be approved by the Secretary of Commerce, we expect them to be forthcoming and provide these recommendations to facilitate your consultation obligations.

Once the EFH designations for chinook salmon are approved, the Corps has a statutory requirement under section 305(b)(4)(B) of the MSFCMA to submit a detailed response in writing to NMFS that includes a description of measures proposed for avoiding, mitigating, or offsetting the impact of the activity on EFH, as required by section 305(b)(4)(B) of the MSFCMA and 50 CFR 600.920(j) within 30 days. If unable to complete a final response within 30 days of final approval, the Corps should provide NMFS an interim written response within 30 days. The District should then provide a detailed response.

We appreciate your continued cooperation in the conservation of listed species and their habitat, and look forward to working with you and your staff in the future. If you have any questions regarding this response, please contact Ms. Martha Volkoff in our Sacramento Area Office, 650 Capitol Mall, Suite 6070, Sacramento, CA 95814. Ms. Volkoff may be reached by telephone at (916) 498-6488 or by FAX at (916) 498-6697.

Sincerely,

Rodney R Mc Innis

for Rebecca Lent, Ph.D.
Regional Administrator

cc: Cay Goude, USFWS, Sacramento
D. McKee, CDFG, Sacramento
NMFS - Sacramento Admin File

BIOLOGICAL OPINION

Agency: Sacramento District, U.S. Army Corps of Engineers

Activity: Delta Wetlands (PN 190109804)

Consultation Conducted By: Southwest Region, National Marine Fisheries Service

Date Issued: AUG 29 2000

I. BACKGROUND

The U.S. Army Corps of Engineers (USACE) first requested formal consultation pursuant to section 7 of the Endangered Species Act (ESA) with the National Marine Fisheries Service (NMFS) on the Delta Wetlands Project (DW) in January, 1991. However, concerns with the 1991 DW proposal resulted in its withdrawal for revision by the project proponents.

A biological assessment for the revised DW proposal was prepared by Jones & Stokes Associates (JSA) and submitted to NMFS on June 21, 1995. Formal consultation for the endangered winter-run chinook salmon was initiated by the USACE with NMFS on July 10, 1995. The draft environmental impact report and environmental impact statement (DEIR/EIS) for the revised DW proposal were released on September 11, 1995.

Early in the consultation period, questions about DW and the interrelated and interdependent water export operations at the Federal Central Valley Project (CVP) and State Water Project (SWP) were raised by the U.S. Fish and Wildlife Service (FWS), the California Department of Fish and Game (CDFG), and NMFS. As proposed by DW, the CVP and SWP pumping plants in the Sacramento-San Joaquin Delta would increase water exports from the Delta above current levels. However, the U.S. Bureau of Reclamation (Reclamation) and the California Department of Water Resources (DWR) were not participants in this section 7 consultation and consistency with the existing biological opinions for CVP/SWP issued by NMFS (2/13/93 and amended 5/95) and FWS (3/6/95) was unclear. To address this issue, the USACE, NMFS, FWS and DW agreed at a meeting on February 1, 1996 that the consultation would: (1) assess the construction and operation of all DW facilities, (2) assess the diversion of water from, and discharge of water to, adjacent waterways within the Delta, and (3) assess reasonably foreseeable impacts resulting from CVP/SWP export operations associated with DW discharges. However, it was also agreed that the incidental take of listed species at the CVP/SWP facilities would be addressed and authorized through the existing biological opinions issued to Reclamation and DWR for the long-term operations of the CVP/SWP.

Based on discussions and analysis during 1995 and early 1996 consultation meetings, the DW project proposal was further revised to include measures to reduce potential adverse effects to listed species. This mitigation plan was submitted to NMFS and FWS by the USACE on February 20, 1996, and NMFS issued a draft biological opinion based on this mitigation plan to the USACE on June 28, 1996.

In response to the March 29, 1996 draft FWS biological opinion and reasonable and prudent alternative for the listed delta smelt and proposed Sacramento splittail, DW requested that the USACE delay their comments on the NMFS and FWS draft biological opinions until agreement regarding the operations of the DW project could be reached. On May 13, 1996, the USACE requested that NMFS and FWS deliver their final biological opinions 60 days after the receipt of USACE comments on the draft biological opinions. These comments were delayed to explore other operational scenarios that would not jeopardize a listed species.

On September 12, 1996, the USACE requested formal conferencing on the impacts of the DW project on the proposed as endangered Central Valley Evolutionarily Significant Unit (ESU) steelhead trout (steelhead).

Further discussions on potential measures to avoid or reduce impacts to listed species continued until early February, 1997, resulting in an operations matrix of measures to reduce impacts to listed species. On February 21, 1997, the USACE transmitted their formal comments on the NMFS draft biological opinion and DW's proposed mitigation measures to reduce impacts to listed species, thereby starting the 60-day clock for delivery of the final opinion. The final biological opinion for the Sacramento River winter-run chinook salmon (winter-run chinook salmon) and a draft conference opinion for the steelhead were issued on May 7, 1997. The final conference opinion for the steelhead was issued on June 26, 1997. Subsequent to final listing, the USACE requested by letter dated November 29, 1999 that NMFS adopt its final conference opinion for the steelhead as its final biological opinion. Because the conditions for converting the conference opinion to the biological opinion had been meet, NMFS converted the conference to the final biological opinion on May 19, 2000. The November 29, 1999 letter from the USACE also requested formal consultation on the Central Valley spring-run chinook salmon (spring-run chinook salmon), listed September 16, 1999. Critical habitat for the spring-run chinook salmon and steelhead were designated subsequent to the USACE reinitiation of consultation, but are also included in this consultation.

II. Proposed Activity

DW proposes a water storage project on four islands within the Sacramento-San Joaquin Delta: Bacon Island, Webb Tract, Bouldin Island, and Holland Tract. Bacon Island, Webb Tract, and Bouldin Island are owned by DW. Holland Tract is partially owned by DW. Bacon Island and Webb Tract will be managed as "reservoir islands". Surplus Delta inflows, transferred water, or banked water would be diverted by siphon onto the two reservoir islands for later sale and/or release for Delta export or to meet Bay-Delta estuary water quality or flow requirements. Bouldin Island and Holland Tract will be managed as "habitat islands" through wetland creation and wildlife habitat management. DW continues to pursue appropriated water rights for this project, but to date has not received approval from the State Water Resources Control Board (SWRCB). Public hearings are scheduled to resume October 10, 2000 at which time concerns not adequately addressed during the 1997 hearings can be presented to the Board.

Portions of the habitat islands will be flooded to shallow depths during the winter to attract wintering waterfowl and support private hunting clubs. Reservoir islands operations may include

shallow-water management during periods of non-storage at the discretion of DW and incidental to the proposed project.

Reservoir Islands

DW will undertake its diversion and discharge operations pursuant to the "final operations criteria," as defined in Appendix 1. Bacon Island and Webb Tract will be managed for year-round water storage. Two intake siphon stations and one discharge pumping station will be constructed along the perimeter of each reservoir island.

Each reservoir island will be designed for water storage levels up to a maximum pool elevation of +6.0 feet relative to mean sea level. The implementation of the final operations criteria, water availability, permit conditions, and requirements of the California Department of Water Resources Division of Safety of Dams may limit storage capacities and may result in a final storage elevation of less than +6.0 feet. The +6.0 feet pool elevation provides an initial estimated combined capacity of 238 thousand acre-feet (TAF) for Bacon Island (118 TAF) and Webb Tract (120 TAF). The total physical storage capacity of the islands may increase over time as a result of soil subsidence. Subsidence normally occurs at a rate of 2 to 3 inches per year. Due to the replacement of agriculture operations with water storage operations, this subsidence is estimated to occur at approximately 0.5 inches per year, resulting in an increase in combined storage capacity to 260 TAF in 50 years.

Diversion Operations: Water diversions onto the reservoir islands would occur when there is surplus water in the Delta under the requirements of the SWRCB's 1995 Water Quality Control Plan (WQCP). This surplus water is defined as the amount of water remaining within the specified export /inflow ratio for that month after all other WQCP requirements have been met and all senior water rights have been appropriated within these WQCP requirements and permitted pumping capacities. This would occur when two conditions are met: (1) all Delta outflow requirements are met and the export limit is exceeded; and (2) water that is available and is allowable for export is not being exported by the CVP and SWP pumps. For purposes of modeling, the second condition is assumed to occur only when water that is allowable for export exceeds the permitted pumping rate. However, the CVP and SWP may not be pumping at capacity because of low demands during the winter, and under these conditions the DW project will still be able to divert water for storage.

Because the reservoir islands will be managed for possible year round storage of water, there may be years during which multiple diversion and subsequent discharges of the reservoirs may occur. The reservoir islands will be filled, drawn down, and refilled in years when the operations criteria, water availability and demands allow. Multiple storage would generally occur during years of moderate precipitation. This management scenario depends on the availability of surplus water early in the year, and a demand for the water to allow an early discharge of the reservoir, followed by another period of available surplus water.

During years of low water demand, water would remain in the reservoirs at the end of the water year (i.e., September 30). Under the DW project, water could remain on a reservoir island for

release in subsequent years. Carry-over storage would generally occur during wet years with low demand.

Any diversion of water by DW will be controlled by its final operations criteria. These criteria set variable diversion rates and conditions based on a number of factors including: location of X2; delta smelt Fall Midwater Trawl Index values; and availability percentages applied to the total surplus water available, the previous day's net Delta outflow, and San Joaquin River inflow. These requirements are described in Appendix 1.

The timing and volume of diversions onto the reservoir islands will depend on how much water flowing through the Delta is not put to reasonable beneficial use by senior water-right holders or is not required for environmental protection. A procedure for coordinating daily DW project diversions with CVP and SWP operations will be established to ensure that DW project diversions capture only available Delta flows, satisfy 1995 SWRCB water quality objectives, and maximize efficiency of DW project water storage operations.

Diversion rates of water onto reservoir islands would vary with pool elevation and water availability. The initial diversion rate for each water year is limited to a combined maximum of 5,500 cfs for a five-day period. Thereafter, the maximum rate of diversion onto either Webb Tract or Bacon Island would be 4,500 cfs (9 TAF per day) at the time diversion begin (i.e., when the head differential between channel water elevation and the island bottom is greatest). The diversion rate would be reduced as reservoirs fill and head differentials diminish. The combined maximum daily average rate of diversion for all islands (including diversions to habitat islands) will not exceed 9,000 cfs. The proposed maximum average monthly diversion rate will be 4,000 cfs.

Discharge Operations: Export of DW project water would mainly take place at the CVP and SWP pumps. Discharges of water from the DW project islands would occur when the CVP/SWP pumping plants are not pumping at full capacity. DW discharge for export at the CVP/SWP would be regulated in a manner that the CVP/SWP export limits, as defined by the WQCP, are not exceeded. Actual timing and volume of discharges from the reservoir islands will depend on periods of demand, Delta regulatory limitations, and CVP/SWP export pumping capacities. For the purposes of this biological opinion, discharges from the DW project islands are not counted as inflow to the Delta, as defined by the 1995 WQCP. Treatment of DW discharges as Delta inflow will constitute new information and may require further consultation.

Discharge of DW project water will occur pursuant to DW's final operations criteria as set out in Appendix 1. Stored water will be discharged from reservoir islands during periods of demand, subject to Delta regulatory limitations and export pumping capacities. Discharges will be pumped at a combined maximum daily average of 6,000 cfs per reservoir island. Combined monthly average reservoir island discharge will be up to 4,000 cfs. Pump stations will discharge under the surface of receiving channel water.

DW's final criteria have several limitations on discharge operations, including: no discharges for export from Webb Tract from January through June; limiting discharges from Bacon Island from

April through June to 50% of San Joaquin River flows at Vernalis; and percentage limitations on discharges form February through July based on unused export capacity at the CVP/SWP pumps.

Shallow Water Management: Incidental to project operations and at times when water is not being stored, the project may include shallow water management on Bacon Island and Webb Tract to enhance forage and cover for wintering waterfowl. From September through May, reservoir islands may be flooded to shallow depths (approximately 1 foot of water per acre for wetland) to create habitat, typically 60 days after reservoir drawdown. During years of late reservoir drawdown, additional time may be necessary before shallow flooding begins to allow seed crops to mature. Once shallow water flooding for wetland management occurs, water will be circulated through a system of inner levees until deep flooding occurs or through April or May. If reservoir islands are not deeply flooded by April or May, water in seasonal wetlands will be drawn down in May, and if no water is available for storage, island bottoms will remain dry until September when the cycle may be repeated. DW project water used for shallow water flooding in April and May may be available for sale.

Siphon Station Design: Two new siphon stations for water diversions will be installed along the perimeter of each reservoir island. Each station would consist of 16 siphon pipes, each 36 inches in diameter. Screens to prevent entrainment of fish in diversions will be installed around the intake end of each existing and new siphon pipe. The individual siphons will be placed at least 40 feet apart to incorporate fish screen requirements. Existing reservoir island siphons may be used to create shallow water wetland habitat. In-line booster pumps will be available on the reservoir islands to supplement siphon capacity during the final stages of reservoir filling.

Pump Station Design: One discharge pump station will be located on each reservoir island. Webb Tract will have 32 new pumps and Bacon Island will have 40 new pumps, each with 36-inch-diameter pipes discharging to adjacent Delta channels. Typical spacing of the pumps will be 25 feet on center. An assortment of axial-flow and mixed-flow pumps will be used to accommodate a variety of head conditions through drawdown. Actual discharge rates for each pump will vary with pool elevations. As water levels decrease on the islands, the discharge rate of each pump will decrease. Existing pump stations on the islands may be modified and used when appropriate to help with dewatering or for water circulation to improve water quality. Pump station pipes will discharge underwater to adjacent Delta channels through a 3-foot by 10-foot expansion chamber, protected by guard piles adjacent to the expansion chambers and riprap on the channel bottom to protect against erosion.

Levee Improvements and Maintenance: Exterior levees on the reservoir islands will be improved to bear the stress and potential erosion caused by interior island water storage and drawdown. The perimeter levees on reservoir islands will be raised and widened to hold water at a maximum elevation of +6.0 feet. Levee improvements will be designed to meet or exceed criteria for levees outlined in DWR Bulletin 192-82. Levee design will address control of wind and wave erosion through placement of rock revetment on levee slopes, and control of project-related seepage through an extensive monitoring and control system. Maintenance activities would include, but are not limited to, placement of fill material, placement or installation of erosion protection

material, reshaping or grading of fill material, herbicide application, selective burning, and regrading or patching of the levee road surface.

Exterior levees on all four islands will be buttressed and improved as described here. In addition, and inner levee system will be constructed and maintained within the islands. This system will consist of a series of low-height levees and connecting waterways to facilitate the management of shallow water during periods of non-storage. The inner levees will be broad, earthen structures similar to those currently in place on existing farm fields.

Habitat Islands

As proposed, Bouldin Island and Holland Tract would be dedicated to management of wildlife and wetland habitat values to offset impacts to terrestrial wildlife and wetlands resulting from operations of the two reservoir islands. A variety of habitats will be created or protected to provide foraging and breeding habitats for a wide range of wildlife and waterfowl species. DW will not discharge for export or rediversion any water from the habitat islands.

Wetland management on the habitat islands will require grading areas, re-vegetating, and diverting water. Improvements will be made to existing pump and siphon facilities, and to perimeter levees, including levee buttressing to meet DWR's recommended standards for levee stability and flood control. No new siphon or pump stations will be constructed on habitat islands. Recreation facilities will be constructed on perimeter levees. Routine levee maintenance activities would not differ from current practices including replenishing riprap, placing fill material, grading, discing, mowing, selectively burning, controlling rodents, and installing rock revetment.

Diversions and Discharges: Bouldin Island and Holland Tract will be managed for improvement and maintenance of wetland and wildlife values through use of a Habitat Management Plan (HMP). The HMP was primarily developed (and finalized in the early 1990s) by CDFG and DW to address project effects on waterfowl. The timing and volume of diversions onto the habitat islands will depend on the needs of wetland and wildlife habitats. Wetland diversions will typically begin in September, and water will be circulated throughout the winter. Existing siphons will be used for diversions to the habitat islands. Fish screens will be installed on all siphons used for diversions.

The maximum rate of proposed diversions onto Holland Tract and Bouldin Island will be 200 cfs per island. Diversions onto the habitat islands will not cause the combined daily average maximum diversion rate of 9,000 cfs for all four project islands to be exceeded. Water will be applied to the habitat islands for management in each month of the year to maintain acreages of open water, perennial wetlands, flooded seasonal wetlands, and irrigated crop lands specified in the HMP. For the purposes of this biological opinion, habitat island discharges shall be treated as not available for sale, export, or rediversion. Sale, export, or rediversion of habitat island discharges will constitute new information and may require further consultation.

Operation and Maintenance: Operation and maintenance activities will include: (1) siphon and pump unit operations and routine maintenance; (2) management of habitat areas, including (but not limited to) the control of undesirable plant species, the maintenance or modification of inner levees, and water circulation in ditches, canals, open water and shallow flooded habitats to facilitate flooding and drainage; (3) fish screen maintenance and monitoring during water diversions for habitat maintenance; (4) wildlife and habitat monitoring under the HMP; (5) perimeter levee inspections and maintenance; (6) aircraft operations for seeding, fertilizing, etc.; (7) operation of recreational facilities using seasonal workers; and (8) monitoring and enforcement of hunting restrictions.

Recreation Facilities

DW proposes to construct 11 recreational facilities on each reservoir island and 10 new recreation facilities on Bouldin Island and 6 new recreation facilities on Holland Tract. Specific types of facilities have not been described by DW. Each recreational facility will be constructed on approximately 5 acres and will include vehicle and boat access. A total of 1200 boat docks and 1472 piles will be placed around exterior island levees in association with the recreational facilities and siphon/pumping stations. The Bouldin Island airstrip will be available for use by hunters and other recreationalists to fly to the island.

Fish Screens

For all four islands, fish screens will be installed around the intake of each existing and new siphon to prevent entrainment and impingement of all adult and most juvenile fish that are present in the Delta. The DW fish screens will maintain a 0.2 fps approach velocity for diversions. The average approach velocity will decrease rapidly as the islands are filled because of decreases in siphon head differential. The preliminary fish screen design consists of a barrel-type screen on the inlet side of each siphon with a hinged flange connection at the water surface (for cleaning). Each siphon opening will be enclosed by a stainless steel, woven wire mesh consisting of seven openings per inch in a screen of 0.035-inch-diameter number 304 stainless steel wire with a pore diagonal of 0.1079 inch. Siphon pipes, with their individual screen modules, will be spaced approximately 40 feet apart on center. Final design elements and installation guidelines will be subject to approval by the USACE and SWRCB with concurrence by FWS, CDFG and NMFS.

III. Listed Species

Central Valley Spring-run Chinook Salmon ESU and Critical Habitat

The Central Valley spring-run chinook salmon (*Oncorhynchus tshawytscha*)(spring-run chinook salmon) was determined by NMFS to be a unique ESU, endemic to the Central Valley of California. The State of California listed the spring-run chinook salmon as threatened species under the California State Endangered Species Act February 1999, followed by federal listing as a threatened species under the ESA (September 1999). In February 2000, NMFS designated critical habitat for the spring-run chinook salmon as all river reaches accessible to listed chinook

salmon in the Sacramento River and its tributaries in California. Also included are river reaches and estuarine areas of the Sacramento-San Joaquin Delta, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge (50 CFR Part 226).

Chinook salmon range along the North Coast from Kotzebue Sound, Alaska to Central California (Healey 1991). Within California there are two distinct spring-run populations; the North Coast Klamath-Trinity and the Central Valley populations. Chinook salmon runs can be differentiated by timing of spawning migration, degree of maturity of fish when entering freshwater, spawning areas, and the emigrating time of the juveniles (DFG 1998).

Adult Central Valley spring-run chinook salmon migrate between March and September, peaking in May through June, and spawn from late August through early October, peaking in September (Yoshiyama et al. 1998). Between 56 to 87 percent of adult spring-run chinook salmon enter freshwater to spawn are three years of age (Calkins et al. 1940, Fisher 1994). Spring-run chinook salmon in the Sacramento River exhibit an ocean-type life history, emigrating to the ocean as fry, subyearlings, and yearlings. Juvenile spring-run chinook salmon may spend several months resting and feeding in the Delta and Estuary for several months prior to entering the ocean (Kjelson et al. 1981).

Central Valley spring-run chinook salmon differ from Central Valley fall-run chinook salmon in timing of migration, adult size, fecundity, and smolt size. The spring chinook salmon run timing enables fish to gain access to the upper reaches of river systems prior to the onset of prohibitively high water temperatures and low flows that inhibit access to these areas during the fall. Fish hold over throughout the summer in these cool upper reaches until reaching sexual maturity and subsequently spawn between August and October (Yoshiyama et al. 1998).

Historically, spring-run chinook salmon were abundant in the Sacramento River system and constituted the dominant run in the San Joaquin River Basin (Reynolds et al. 1993), occupying the upper and middle reaches (450-1,600 m in elevation) of the San Joaquin, American, Yuba, Feather, Sacramento, McCloud and Pit Rivers. Smaller sustaining populations were found throughout most other tributaries with sufficient cold-water flow to maintain spring-run adults through the summer prior to spawning (Stone 1874, Rutter 1904, Clark 1929, Meyers 1998).

Clark (1929) estimated that there were historically 6,000 stream miles of salmonid habitat in the Sacramento-San Joaquin River Basin, but by 1928 only 510 miles remained. The elimination of access to spawning and rearing habitat resulting from the construction of impassable dams has extirpated spring-run chinook salmon from the San Joaquin River Basin, historically supported the greatest numbers of spring-run chinook salmon. Construction of impassible dams has also curtailed access to suitable spawning habitat in the upper Sacramento and Feather Rivers.

The remaining streams believed to sustain populations of wild spring-run chinook salmon are Mill and Deer Creeks, and possibly Butte Creek (tributaries of the Sacramento River). These

remaining populations are relatively small and exhibit a sharply declining trend. Demographic and genetic risks of extirpation due to small population size are thus considered to be high. Spring-run chinook salmon are unable to access historical spawning and rearing habitats in the Sacramento and San Joaquin River Basins are restricted to spawning in the mainstem tributaries of the Sacramento River. This limited spawning habitat, as well as corridors used for migration, are substantially marred by elevated water temperatures, agricultural and municipal diversions and returns, restricted and regulated flows, entrainment of migrating fish into unscreened or poorly screened diversions, and the poor quality and quantity of remaining habitat.

Central Valley Steelhead Critical Habitat

On March 19, 1998 NMFS published its final rule (47 CFR Part 73) to list two ESU(s), the Lower Columbia River and the Central Valley, California, as threatened under the ESA. Subsequent to their listing, NMFS designated critical habitat for the Central Valley steelhead ESU (*Oncorhynchus mykiss*)(steelhead) on February 16, 2000 (50 CFR Part 226).

Critical habitat is designated to include all river reaches accessible to listed steelhead in the Sacramento and San Joaquin Rivers and their tributaries in California. Also included are river reaches and estuarine areas of the Sacramento-San Joaquin Delta, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Excluded are areas of the San Joaquin River upstream of the Merced River confluence and areas above specific dams or longstanding, naturally impassable barriers.

IV. ENVIRONMENTAL BASELINE

Sacramento-San Joaquin Delta: The Sacramento River Basin provides approximately 75% of the water flowing into the Delta (DWR 1993). With the completion of upstream reservoir storage projects, the Sacramento River, San Joaquin River, and Delta waterways are now highly regulated systems, such that the current seasonal distribution of flows differs from historical patterns. The magnitude and duration of peak flows during the winter and spring are reduced by water impoundment in upstream reservoirs. Instream flows during the summer and early fall months have increased over historic levels for deliveries of municipal and agricultural water supplies. Overall, water management now reduces natural variability by creating more uniform flows year-round.

To a great extent, stremflow volume and runoff patterns regulate the quality and quantity of habitat available to juvenile salmonids. Salmon are highly adapted to seasonal changes in flow. Increased stream flows in the fall and winter stimulate juvenile salmonid downstream migration, improve rearing habitat, and improve smolt survival to the ocean. Over the last few years an increasing trend has been noted in the size of the winter-run chinook salmon run. This increase has been attributed to a number of factors, including favorable environmental conditions, implementation of temperature controls on water released from storage, modified operations of the Red Bluff Diversion Dam, and screening of select diversions. However, increasing trends

have not been noted for the remaining ESU(s) that may be more greatly influenced by changes in natural flow in the Delta waterways from CVP/SWP pumping in the south Delta. These conditions have adversely affected Central Valley salmonids, including the spring-run chinook salmon, through reduced survival of juvenile fish.

Juvenile salmon migrate downstream from their upper river spawning and nursery grounds to lower river reaches and the Delta prior to entering the ocean as smolts. Historically, the tidal marshes of the Delta provided a highly productive estuarine environment for juvenile anadromous salmonids. During the course of their downstream migration, juvenile spring-run chinook utilize the Delta's estuarine habitat for seasonal rearing, and as a migration corridor to the sea. Since the 1850's, reclamation of Delta islands for agricultural purposes has caused the cumulative loss of 94 percent of the Delta's tidal marshes (Monroe and Kelly 1992).

In addition to the degradation and loss of estuarine habitat, downstream migrant juvenile salmon in the Delta are currently subject to adverse conditions created by water export operations at the CVP/SWP. Specifically, juvenile salmon are adversely affected by: (1) water diversion from the mainstem Sacramento River into the Central Delta via the manmade Delta Cross Channel, Georgiana Slough, and Three-mile Slough; (2) upstream or reverse flows of water in the lower San Joaquin River and southern Delta waterways; and (3) entrainment at the CVP/SWP export facilities and associated problems at Clifton Court Forebay. In addition, salmonids are exposed to increased water temperatures from late spring through early fall in the lower Sacramento and San Joaquin River reaches and the Delta. These temperature increases are primarily caused by the loss of riparian shading and thermal inputs from municipal, industrial, and agricultural discharges.

Diversion into the Central and South Delta: Juvenile salmon emigrating from spawning and rearing areas in the Sacramento River may be diverted into the interior Delta through the manmade Delta Cross Channel, Georgiana Slough, or Three-mile Slough. Fisheries investigations by Schaffter (1980) and Vogel et al. (1988) using winter-run chinook salmon juveniles suggests that the number of salmon diverted into the central and South Delta are proportion to flow into the central Delta at the Delta Cross Channel.

Studies conducted using fall-run chinook salmon smolts have demonstrated substantially higher mortality rates for those fish passing into the interior Delta (FWS 1990 and FWS 1992). The increased mortality rates reflect increased susceptibility to predation, delays in migration, exposure to increased water temperatures, and increased susceptibility to entrainment losses at the CVP/SWP export pumps and other water diversion locations within the Delta.

Reverse Flow: Channel hydrodynamics in the lower San Joaquin River and other southern Delta waterways are altered by CVP/SWP water export operations in the south Delta. CVP/SWP pumping can change the net flow in these channels from a westward direction to an eastward direction, particularly during periods of drought and high pumping rates. When present, these 'reverse' flows move the net flow of water east up the San Joaquin River and then south towards the CVP/SWP export facilities, via Old and Middle Rivers. In general, the magnitude of reverse flow increases with the rate of export pumping. Although the mechanism is not well understood,

juvenile salmon frequently pass with the net flow of water into a complex network of channels leading to the CVP/SWP water export facilities in the South Delta. Indirect losses of juvenile salmon are thought to occur in these southern Delta channels through predation, disorientation, and delayed out-migration. Direct losses to predation and entrainment are known to occur in Clifton Court Forebay and at the CVP/SWP pumping plants.

Entrainment at CVP/SWP and Clifton Court Forebay: The CVP and SWP Delta pumping plants presently have maximum capacities of 4,600 cfs and 10,300 cfs, respectively. However, the State's existing USACE permit generally restricts the SWP's level of pumping by limiting the monthly maximum average inflow into Clifton Court Forebay to 6,680 cfs. Both projects operate fish collection facilities within the intake channels of their canals using a louver system which resembles venetian blinds and acts as a behavioral barrier. Although the slots are wide enough for fish to enter, approximately 75 percent of the chinook salmon encountering the louvers sense the turbulence and move along the face of the louvers to enter the bypass system. The remaining 25 percent are lost to the pumping plant and canal. Additional losses occur inside the fish screening facilities from predation to striped bass and other predators. Significant handling and trucking losses also occur during the process used to transport salvaged fish to a release site in the western Delta.

Clifton Court Forebay is a 31 TAF regulating reservoir at the pump intake to the SWP's California Aqueduct. The forebay is operated to minimize water level fluctuations at the intake by draining water through open gates at high tide and closing the gates at low tide. When the gates are opened, inflow can exceed 20,000 cfs for a short time and then decreases as the water levels inside and outside the forebay reach equilibrium. Within the forebay, juvenile salmon are subject to severe predation loss. In a series of investigations by CDFG, predation loss rates of marked hatchery fall-run salmon released in Clifton Court Forebay during April, May, and June ranged from 63 to 97 percent.

Delta Water Quality: Increased water temperatures, insufficient dissolved oxygen, and contaminants have degraded the aquatic habitat quality of rearing and migrating salmonids. Discharges from industrial and agricultural sources have led to increased water temperatures and contaminant levels. Water temperatures typically exceed 60 or 66 degrees Fahrenheit from April through September. Contaminants such as mercury from mine discharges may be well above 'safe' levels for beneficial uses in the Delta. Dissolved oxygen (DO) levels are affected by municipal, industrial, and agricultural discharges. Salmonids function normally at DO levels of 7.75 mg/L and may exhibit distress symptoms at 6.0 mg/L (Reiser and Bjornn 1979). Low dissolved oxygen levels impair metabolic rates, growth, swimming ability, and the overall survival of young salmonids.

Current Operations Under the Bay-Delta Accord and 1995 WQCP: Significant actions to protect beneficial uses in the Delta were initiated by a three-year agreement between the Federal government, State of California, water users, and environmental interests in the Bay-Delta Accord of December 15, 1994 (Accord). Through the Accord and the 1995 WQCP, water quality objectives for the protection of fish and wildlife have been established for the following parameters: dissolved oxygen, salinity, Delta outflow, river flows, export limits, and Delta Cross

Channel gate operation. An "operations" group (CALFED Ops Group) coordinates CVP/SWP projects operations, using current biological and hydrological information for the management of water quality, endangered species, and the Central Valley Project Improvement Act. Water quality objectives and criteria established by the Accord are based on historical operations of the CVP/SWP and the life history needs of the fish species affected by Delta water operations. The combined effect of these various criteria seems to have improved the environmental baseline of the Delta to a level which provides adequate protection for the conservation of listed species and critical habitat.

Small scale restoration projects are being undertaken in many locations throughout the Delta, including restoration of Decker, Twitchell, and Bradford Islands. But paramount to these efforts is the approaching implementation of CALFED, a long-term restoration and management plan for the Bay-Delta estuary. This effort to balanced the water needs of all parties has brought together the private stakeholders, the public, and state and federal agencies. Through its implementation, CALFED seeks to restore ecological health to the Bay-Delta estuary and throughout the entire Sacramento River-San Joaquin River watershed, improve the quality and supply of water to the state, and protect the sustainability of the water supply. The goal of CALFED's Ecological Restoration Program (ERP) "is to improve aquatic and terrestrial habitats and natural processes to support stable, self-sustainable populations of diverse and valuable plant and animal species, and includes recovery of species listed under the State and Federal Endangered Species Acts" (CALFED 2000). Examples of activities to be implemented include large-scale restoration projects on Clear Creek, Deer Creek, and the San Joaquin River, removal of select dams, purchase of additional upstream flows, protection and restoration of the natural meander corridor to the Sacramento River, and improvement of water quality throughout the watershed.

V. Assessment of Impacts

The DW project operations are likely to adversely effect the endangered spring-run chinook salmon and diminish some of the fisheries habitat benefits gained in the Bay-Delta Accord. Juvenile spring-run chinook salmon will be adversely affected through reduced Delta outflow, higher reverse flows in central and south Delta waterways, and entrainment in local diversions of the central and southern Delta, and entrainment at the CVP/SWP pumping plants or habitat island drawdowns. Some construction related impacts may occur, but are likely to be minor in nature.

Hydrologic data discussed in the assessment of impacts which follows were provided by JSA. The results of JSA's computer model analyses were provided to NMFS in a December 20, 1996 memorandum analyzing the proposed operations matrix and the no-project alternative, or baseline condition[1]. These databases are used in the following assessment which focuses on the months of September through May to evaluate impacts to spring-run chinook salmon as well as winter-run chinook salmon and steelhead.

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[1] For the purposes of this biological opinion, the No-Project Alternative includes water project operations in the Central Valley Basin as defined by the 1995 WQCP and 1994 Accord.

A. Diversion Operations

The DW project proposal relies on diversions of 'surplus' Delta inflows during the winter and early spring months. DW project operations during the months of March and June through September coincide with the presence of spring-run chinook salmon in the Delta. DW will offer some protection to out-migrating juvenile spring-run chinook salmon by not diverting flows for storage between April and May. Depending on the presence of delta smelt in the area, diversions may be curtailed by 50% as early as February 15 and as late as June 30 to minimize entrainment of eggs or larvae, resulting in improved flows for migrating adult spring-run chinook salmon.

The inflow-export criteria[2] established by the Accord were developed to replace and lead to, at minimum, equivalency with the historic QWEST[3] criteria for protection of fish and wildlife, including the spring-run chinook salmon. Historic Delta inflows from upstream rivers and existing CVP/SWP operations under the inflow-export criteria were simulated by computer models to aid in the QWEST equivalency determination. In addition to the Accord's water quality criteria, the NMFS assessment and equivalency determination during the development of the Accord assumed the CVP and SWP exports were limited by: (1) current CVP/SWP pumping plant capacities, (2) existing Corps permits, (3) south of Delta storage capacity, (4) the independent operation of the CVP/SWP pumping plants under their existing State water rights, and (5) inflow originating from upstream sources. These limits on export and the Accord's criteria results in Delta conditions which are frequently above the minimum WQCP standards.

As proposed, DW diversion operations will frequently reduce Delta outflow. The decrease in outflow may reach an average daily maximum rate of 9,000 cfs and an average monthly maximum rate of 4,000 cfs. Delta outflows would be reduced by 5 percent or greater in approximately 10 percent of the simulated years (1922-1991) with a maximum reduction in outflow of 25 percent. On an annual basis, DW diversions would directly decrease outflow by a mean of 192 TAF and a maximum of 490 TAF. In comparison, the CVP and SWP export an average of 6.1 million acre feet per year. Water diversions to the DW islands will increase the percent of inflow diverted in all months of the year.

Project water diversions will also directly reduce the net western flow of freshwater in the central Delta (QWEST). Reduced QWEST in the central Delta will be in direct proportion to the DW diversion rate. DW diversions will also directly increase the net reverse flows down Old and Middle rivers between Webb Tract and Bacon Island by a maximum of 4,500 cfs.

Analysis of DW diversion opportunities shows that diversions onto the reservoir islands can occur as much as 36 percent of the time simulated during September through May. Table 1 presents the number of years by month over the 70 year model simulation that DW was able to

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[2] The Accord established inflow-export limits for the CVP/SWP pumping plants as 65 percent in September, October, November, December and January, 35-45 percent in February, and 35 percent in March, April and May.

[3] QWEST is the calculated estimate of the net flow from the central Delta to the western Delta. It represents the sum of the flows in the lower San Joaquin River, False River, and Dutch Slough. Negative QWEST values mean 'reverse flow', or net flow from the western Delta into the central Delta.

divert water onto the reservoir islands and the monthly average maximum diversion rate. Most DW diversion events occur in October through February.

Table 1. Diversion frequency during the 70 year modeled simulation and maximum diversion rates (cfs) (from JSA 1996).

	Diversions (years out of 70)	Average Maximum Rates of Diversion (cfs)
September	8	4,000
October	21	3,871
November	29	4,000
December	28	3,871
January	45	3,600
February	40	4,000
March	39	1,144
April	0	0
May	0	0

These changes in Delta hydrodynamics during the critical rearing and emigration period for juvenile spring-run chinook salmon is expected to adversely affect the species. Decreases in Delta outflow, increases in export-inflow levels, and reductions in QWEST are likely to reduce the survival of rearing and emigrating juvenile fish. Existing reverse flow conditions in the lower San Joaquin River, Old River, and Middle River will be exacerbated by DW diversions. Natural flow cues for emigrating spring-run chinook salmon smolts and migrating adults will be adversely affected. The number and rate of juvenile spring-run chinook salmon drawn from their typical migration route into central and southern Delta waterways is also likely to increase.

Once in the complex configuration of waterways in the central and southern Delta, fish are subjected to a variety of adverse conditions that decrease their chances for survival. Lower survival rates are expected due to the longer migration route, where fish are exposed to increased predation, higher water temperatures, unscreened agricultural diversions, poor water quality, reduced availability of food, and entrainment at the CVP/SWP export facilities. Through reduced Delta outflow and decreases in net westerly flow, DW diversion operations are expected to degrade chinook salmon rearing habitat in the Delta, degrade conditions for natural smolt out-migration stimulus and seaward orientation, and generally reduce smolt survival. During dry and critical water years, DW diversions have an even greater potential for adversely affecting channel hydrodynamics and reducing spring-run chinook salmon survival already strained by low flows, poor water quality, and high CVP/SWP entrainment rates.

Fish screens installed on all DW intakes are expected to adequately prevent the direct entrainment of juvenile spring-run chinook salmon onto DW reservoir and habitat islands. Eliminating existing unscreened diversions on DW reservoir and habitat islands is expected to provide a project benefit to spring-run chinook salmon.

B. Discharge Operations

As currently proposed, DW's discharge operations rely on the CVP/SWP pumping plants in the south Delta to transport project water to potential buyers. Export of DW discharges by the CVP/SWP is expected to increase spring-run chinook salmon losses in the Delta through entrainment, predation, and diversion with the net flow down Old and Middle Rivers.

During DW discharge operations, water will be released from the reservoir islands to Delta waterways for re-diversion at the CVP/SWP pumping plants. Water released from the habitat islands will not be available for re-diversion or export and should add to Delta outflow, providing some benefit to Delta species if the habitat island releases occur during favorable aquatic habitat conditions in the Delta. CVP/SWP export rates are expected to increase above baseline levels as a result of reservoir island releases. The frequency of CVP/SWP operations approaching or reaching maximum inflow-export levels will increase.

Analysis of DW discharge opportunities shows that discharges from the reservoir islands generally occur 14 percent of the simulated time from September through May. Most of these discharge events occur in April and May. Table 2 presents the number of years by month over the 70-year modeled simulation that DW was able to discharge water from the reservoir islands and the monthly average maximum discharge rate. Annual discharges from the DW reservoir islands range from zero to 306 TAF, with an average annual diversion of 154 TAF. Most annual DW discharge events occur in April through September.

Table 2. Discharge frequency during the 70 year modeled simulation and maximum discharge rates (cfs) (JSA 1996).

	Discharges (years out of 70)	Maximum Rates of Discharge (cfs)
September	15	1,777
October	8	962
November	5	743
December	6	1,758
January	2	956
February	5	1,742
March	4	1,088
April	20	450
May	29	599

Discharges from the DW reservoir islands would occur during critical rearing and emigration periods of the juvenile spring-run chinook salmon. These discharges to export at the CVP/SWP pumping plants will increase the reverse flows in Old and Middle Rivers by an average maximum of 1765, 1161, 500, and 660 cfs during February, March, April, and May, respectively, or by 25 percent, 19 percent, 8 percent, and 10 percent over average baseline conditions. Spring-

run chinook salmon enter the Delta as yearlings from November through April or more often as fry or fingerlings from March through June (Yoshiyama 1998). Smoltification is believed to occur as the juvenile salmon near the freshwater-saltwater transition. Delays in migration may be deleterious to smoltification. Spring-run chinook yearlings, fry, or fingerlings emigrating through the Central Delta may have difficulty following net flows to the ocean under conditions resulting from the operation of the Delta Wetlands Project. Proposed discharge prohibitions for Webb Tract during January through June should minimize potential adverse affects to emigrating juveniles from reverse flows. Additionally, DW opportunities for discharge to export at the CVP/SWP pumping plants increase during some dry and critical water year types. Discharges from the habitat islands may supply Delta channels with prey organisms of the spring-run chinook salmon, increased food availability and benefit rearing juveniles. Potential impacts from dissolved oxygen level reductions caused by high biological oxygen demand of the release water are addressed below.

C. Combined DW Operations Impacts to Baseline Conditions

Combined operations of the DW project include diversions of water onto, and discharge of water from, the reservoir and habitat islands. Since DW proposes to operate alternatively between diversions and discharges within a season, combined DW project operations and its effects on channel hydrodynamics must be assessed for periods of juvenile spring-run chinook salmon rearing and emigration.

Analysis provided by JSA indicates that many of the flow variables important to juvenile salmon survival in the Delta, such as outflow, QWEST, and flows in Old and Middle Rivers, are often negatively affected by DW operations.

Decreases in QWEST and outflow from baseline conditions in December through February by 1,000 cfs or greater occurred 14 to 20 percent of the time modeled (JSA 1996). Increases in QWEST and outflow values during February through May also occurred. These increases were generally less than 100 cfs, however there were several instances where the increases exceeded 100 cfs.

The combined effects of DW diversions onto Bacon Island and discharges from both reservoir islands increased the net southernly flow in the Old and Middle Rivers north of the export facilities. Increased reverse flows occurred from January through May with 40 and 55 percent of DW operations resulting in increased reverse flows in April and May. Reverse flows in Old and Middle Rivers increased by greater than 1,000 cfs during DW operations 6.0, 4.0, and 1.5 percent of the time in December, February, and March, respectively. DW operations in December showed an incremental improvement to reverse flow conditions in Old and Middle Rivers during 35 percent of DW operations. It is also important to consider that the JSA operations model simulates monthly average DW operations and monthly average Delta hydrological conditions. Daily conditions can vary widely from the monthly averages generated by the model and include other significant variables such as tidal fluctuations.

The combined operation of DW water diversions onto the reservoir islands, discharges into adjacent Delta waterways, and the subsequent export of DW water at the CVP/SWP pump plants is expected to directly and indirectly reduce the survival of juvenile spring-run chinook salmon in the Delta. Decreases in Delta outflow, higher net southerly flows in Old and Middle rivers, and decreases in QWEST adversely affect spring-run chinook salmon primarily through increased entrainment into the central and southern Delta waterways where they are subject to longer migration routes, increased predation, unscreened diversions, poor water quality, decreased westward flow cues, and losses at the CVP/SWP export facilities.

Appendix 2 shows average monthly values for CVP/SWP export levels, QWEST, Delta outflow, and Old and Middle Rivers flows for baseline and DW operations conditions. These values are generated form the DeltaSOS monthly modeling simulation results provided by JSA.

D. Specific Criteria Impacts

The following discusses the effects of specific proposed operational criteria on spring-run chinook salmon. These measures have been proposed by DW to minimize project impacts to the spring-run chinook salmon.

In general, most of the operational criteria proposed by DW for minimizing impacts do reduce the potentially significant adverse effects the project would have on the spring-run chinook salmon. Reductions in the rate and volume of diversions, required X2 positions for diversion initiation, and diversion prohibitions or limitations during sensitive periods all contribute to reduced degradation of the existing environmental baseline. Limiting diversions to a certain percentage of the Delta outflow in critical emigration months may provide significant reductions in the level of impact that would otherwise occur in critical or dry water year types.

Webb Tract discharge prohibitions from January through June avoid significant impacts to aquatic habitat quality in the Webb Tract vicinity that would have occurred during months of spring-run chinook salmon juvenile presence. Habitat island releases, which are not available for export or rediversion, should benefit juveniles present in the vicinity, provided the existing hydrologic conditions allow for proper environmental cues to emigrating salmonids.

Fish screens installed on all of the project intakes should eliminate entrainment of spring-run chinook salmon onto the project islands. The proposed fish screens will have a maximum approach velocity of 0.2 feet per second, which surpasses NMFS screening criterion for screens to protect anadromous salmonids. Final screen designs have yet to be reviewed by NMFS fish passage engineers.

Creating 200 acres of delta smelt rearing habitat and the replacement of lost aquatic habitat, due to construction related impacts, at a 3:1 ratio should also provide usable rearing habitat for salmonid juveniles. However, lost riparian and shaded riverine aquatic habitat (SRA), discussed below, is not currently mitigated. Proposed June through November construction windows will minimize construction related impacts to spring-run chinook salmon.

Measures proposed by DW for years in which the Fall Midwater Trawl Index of the delta smelt is less than 239 are more restrictive than the measures analyzed in this opinion, providing substantial reductions in project effects to spring-run chinook salmon, winter-run chinook salmon, and steelhead, when they are implemented. However, for the purposes of making determinations as to whether the DW project is likely to jeopardize the spring-run chinook salmon, only the 'base case' scenario of proposed operational criteria has been assessed.

E. Water Quality

Potential water quality impacts from DW project releases off of the reservoir and habitat islands include increased water temperatures and decreased dissolved oxygen (DO) levels. The months of April, May, and September often have Delta water quality conditions that are not suitable for salmonid rearing and migratory behaviors. DW proposes to increase water temperatures by a maximum of four degrees Fahrenheit when channel temperatures are between 55 and 66 degrees Fahrenheit and by a maximum of two degrees Fahrenheit when channel temperatures are 66 to 77 degrees Fahrenheit. At channel temperatures above 60 degrees, increases of up to four degrees Fahrenheit across the entire channel may cause physiological sublethal stress effects, impair predation avoidance abilities, terminate smoltification, and cause migration delays or blockages (Boles 1988, Brett 1982, Wedemeyer et al. 1980, Zaugg and Adams 1972). Higher temperatures decrease aquatic habitat productivity, while nutritive needs of salmonids increase. Impacts to salmonids may decrease if temperature changes affect only a portion of the channel, thereby allowing for avoidance of increased temperature plumes. Impacts to salmonids can be avoided if release-water temperatures are less than or equal to channel temperatures.

Island releases that cause local dissolved oxygen levels to drop below 6.0 mg/L may also cause sublethal physiological impacts to emigrating salmonids. Reiser and Bjornn (1979) found that salmonids exhibit various distress symptoms at 6.0 mg/L. Low dissolved oxygen levels impair metabolic rates, growth, swimming ability, and the overall survival of young salmonids. DW proposes to prohibit discharges when the island water DO is below 6.0 mg/L. Additionally, DW proposes to prohibit discharges that will cause a DO drop in the receiving water to below 5.0 mg/L. Localized DO drops to 5.0 mg/L may adversely affect rearing and emigrating juveniles if the drop affects the entire channel cross-section. Impacts to salmonids may be decreased if effects are temporary in nature or affect only a portion of the channel, thereby allowing for avoidance of decreased DO areas.

F. Levee Maintenance

While losses of low salinity or freshwater habitat from levee failure may be reduced through improved levee protection, maintenance of levees on the habitat and reservoir islands may result in damage or loss of riparian vegetation. Shaded riverine aquatic cover (SRA), or the zone of overhanging riparian vegetation along the stream banks, provides temperature moderation, protective cover, and allochthonous materials and energy input to the stream. It provides food and habitat for invertebrates that in turn become prey of salmonids and other fish. Removal of this vegetation, or large reductions in the quality and quantity of SRA vegetation eliminates these inputs from the stream and estuary. Juvenile spring-run chinook salmon rearing or emigrating

through areas that have suffered vegetation losses may be at a greater risk of predation, increased physiological stress from lack of cover and high temperatures, and have reduced food availability.

Permanent losses to this habitat are expected to occur during normal levee construction and maintenance if methods such as grading, riprap placement, herbicide application, selective burning and mowing are used. Approximately 152 acres of exterior levee slopes around the reservoir islands will be improved and maintained to protect the water storage capabilities of the islands. If strict vegetation control methods are used, existing vegetation on the project's 152 acres of levees may be permanently lost.

G. Recreation Facilities, Siphon Stations and Pumping Stations

Construction activities at the recreation and siphon/pump facilities may temporarily affect juvenile spring-run chinook salmon through disturbance or degradation of water quality. Boat wakes may increase levee erosion (increasing levee maintenance) and raise local turbidity levels. Increased inputs of oil and gasoline from increased boat traffic and storage will continue to degrade the water quality within the channels and reservoirs. Permanent impacts to spring-run chinook salmon rearing habitat may occur through destruction of shallow water vegetated habitat and the creation of predator habitat under docks and around siphon/pump station pilings. DW proposes to limit their construction activities to June through November to minimize construction related impacts to juvenile salmonids.

H. Delta Smelt Monitoring

DW proposes a sampling program in the vicinity of their reservoir islands from December through August to monitor the presence of delta smelt. Presence of delta smelt triggers 50 percent reductions in diversion and discharge activities on the reservoir islands. The sampling program may incidentally capture juvenile spring-run chinook salmon depending on gear types and sampling methodologies used. Results of this sampling may trigger the reduction in diversion and discharge of water, resulting in an overall benefit to spring-run chinook salmon. The final monitoring plan will be developed after issuance of this biological opinion.

I. Interrelated and Interdependent Effects of the CVP/SWP Operations

Modeling of CVP/SWP operations in coordination with DW discharge operations was performed by JSA with a Delta operations model (DeltaSOS). These results are presented in the BA and DEIR/EIS. While the DeltaSOS model uses results from the CVP/SWP operations model (DWRSIM), an integrated analysis of DW project operations with the participation of Reclamation (CVP) and DWR (SWP) has not been performed to date. Concern has been expressed that DW's analysis has not integrated some important components of CVP/SWP operations. Specifically, the re-operation of upstream reservoirs has the potential to adversely affect spring-run chinook salmon in the Sacramento River.

Although project proponents stated during consultation that they do not anticipate DW operations will result in the re-operation of upstream CVP ans SWP reservoirs, NMFS and the CVP/SWP water projects believe the potential does exist. In commenting on the DEIR/EIS, DWR expressed concern with JSA's model analysis for DW because: (1) the DeltaSOS model does not have the ability to account for upstream and downstream reservoir storage, and (2) there has been no consideration for real-time operational adjustment for reducing incidental take of ESA listed fish.

Potential adverse affects to spring-run chinook salmon from re-operating upstream reservoirs relate primarily to upper Sacramento River in stream flow levels and water temperature control. Releases from Shasta and Trinity reservoirs could be reduced if DW discharges replace a portion of water exports at the Delta pumping plants. Flow reductions which approach or meet minimum in stream flows in the upper Sacramento River are likely to result in the stranding of juvenile fish in side channels with shallow inverts and broad, flat-gradient, near-shore areas. Temperature control operations could be adversely effected by re-operation of upstream reservoirs. Re-scheduling of CVP water deliveries may occur with the availability of additional DW water supplies to the south of Delta water users. The re-scheduling of CVP deliveries could alter seasonal reservoir storage levels and adversely effect temperature control operations designed to protect incubating spring-run chinook eggs and larvae. However, it must be noted that significant re-operation of the CVP or SWP will result in the re-initiation of consultation on these projects with Reclamation and DWR.

VI. CONCLUSION

Based on the best available information and the analysis in this biological opinion, it is NMFS's biological opinion that the proposed construction and operation of the DW water storage project is not likely to jeopardize the continued existence of the spring-run chinook salmon or result in the adverse modification of spring-run chinook salmon critical habitat, nor result in the adverse modification of Central Valley steelhead critical habitat.

INCIDENTAL TAKE STATEMENT

Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. NMFS further defines harm to include any act which actually kills, or injures fish or wildlife and emphasizes that such acts may include significant habitat modification or degradation that significantly impairs essential behavioral patterns, including breeding, spawning, rearing, migration, feeding or sheltering. Incidental take is defined as take of a listed animal species that results from, but is not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7 (b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the proposed action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

Section 7(b)(4) of the ESA requires that when a proposed agency action is found to be consistent with section 7(a)(2) of the ESA, and the proposed action may incidentally take individuals of a listed species, NMFS will issue a statement that specifies the impact of any incidental taking of endangered or threatened species. It also states that reasonable and prudent measures, and terms and conditions to implement the measures, be provided that are necessary to minimize such impacts. Under the terms and conditions of section 7(o)(2) and 7(b)(4), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of the Incidental Take Statement.

The measures described below are non-discretionary. They must be implemented by the USACE so that they become binding conditions of any grant or permit issued to Delta Wetlands, as appropriate, for the exemption in section 7(o)(2) to apply. The USACE has a continuing duty to regulate the activity covered in this Incidental Take Statement. If the USACE: (1) fails to assume and implement the terms and conditions of the Incidental Take Statement, and/or (2) fails to require Delta Wetlands to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the USACE and Delta Wetlands must report the progress of the action and its impact on the species to NMFS as specified in this Incidental Take Statement (50 CFR §402.14(i)(3)).

This incidental take statement is applicable to the construction and operations of the Delta Wetlands project as described in the biological assessment submitted on June 21, 1995, the draft environmental impact report/environmental impact statement issued on September 11, 1995, and as modified by the February 21, 1997, letter and proposed operations matrix from the USACE to NMFS.

A. Amount or Extent of Take

The NMFS anticipates that Delta Wetlands (DW) reservoir and habitat island operations will result in take of listed salmonids. This will primarily be in the form of harm to salmonids by impairing essential behavior patterns as a result of reductions in the quality or quantity of their

habitat. In addition, NMFS anticipates that some juveniles may be killed, injured, or harassed during the construction and implementation of this project.

The take of listed salmonids will be difficult to detect because finding a dead or injured salmonid is unlikely as the species occurs in habitat that makes such detection difficult. The impacts of DW operations will result in changes to the quality and quantity of salmonid habitat. These changes in the quantity and quality of salmonid habitat are expected to correspond to injury to or reductions in survival of salmonids by interfering with essential behaviors such as rearing, feeding, migrating, and sheltering. Because the expected impacts to salmonid habitat correspond with these impaired behavior patterns, NMFS is describing the amount or extent of take anticipated from the proposed action in terms of limitations on habitat impacts. The NMFS expects that physical habitat impacts will be: consistent with the project description in terms of location, scope, and compliance with proposed minimization and mitigation measures, compliant with the terms and conditions of this incidental take statement, and within the expected effects of DW operations as described in this Opinion. Adverse effects to, and incidental take of, listed salmonids are primarily expected during the September through May time period.

Anticipated incidental take will be exceeded if DW operations are not in compliance with the project description or the terms and conditions of this incidental take statement, or if effects of DW operations are exceeded or different than the expected effects described in this Opinion.

For example, NMFS anticipates that DW operations will decrease the amount of outflow in the Sacramento/San Joaquin Delta in all months of the year. DW operations could reduce outflows by five percent or more (up to an expected maximum of 25 percent) in ten percent of simulated years. This decrease in outflow is expected to result in reduced feeding and rearing success, or reduced survival of juveniles drawn into the complex maze of waterways in the Delta.

Discharges off of DW islands are expected to increase local channel water temperatures and decrease local dissolved oxygen (DO) levels, particularly during the months of April, May, and September. Increased temperatures and reduced DO levels are expected to result in sub-lethal physiological stress leading to reduced fitness and survival, termination of smoltification, and delays in migration. DW operations are expected to result in DO level changes to no less than 5.0 mg/L and temperature increases of no more than four degrees (or two degrees, depending on ambient water temperatures) in the receiving waters.

The NMFS does not anticipate any incidental take from entrainment during DW diversions or as result of fish screen operations because NMFS anticipates that the screens will be installed to meet or surpass NMFS' screening criteria for anadromous salmonids and shall be maintained properly.

As a result of levee maintenance and installation of boat docks and their operations and ongoing maintenance of project island exterior levees, riparian and SRA habitat are expected to be lost and suppressed and shallow water vegetated habitat will be lost or negatively affected (through creation of predator holding habitat and oil and gas inputs). Changes in instream habitat around DW islands, which is also critical habitat for Central Valley steelhead and Central Valley spring-

run chinook salmon, are expected to reduce rearing and feeding opportunities for juvenile salmonids migrating through the area, resulting in reduced fitness and survival rates.

Operation and maintenance of the DW facilities and the ongoing monitoring program for delta smelt may also incidentally capture listed salmonid juveniles. However, at this time NMFS does not have the information available regarding the specific details of the monitoring program to estimate the amount or extent of incidental take.

Incidental take of listed salmonids at the Central Valley Project (CVP) and State Water Project (SWP) facilities as a result of changes in the flows within the Delta from DW operations is not addressed within this biological opinion and is therefore not covered by this incidental take statement. The CVP and SWP currently operate under a separate ESA Section 7 consultation and should changes in their operations, or exceedance of incidental take levels, occur as a result of DW operations the CVP/SWP consultation shall be reinitiated.

Reasonable and Prudent Measures for Spring-run Chinook Salmon

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize the incidental take of spring-run chinook salmon caused by DW.

1. Measures shall be taken to reduce the extent of entrainment and predation during DW diversion operations through the use of fish screens meeting or exceeding NMFS criteria.

2. Measures shall be taken to reduce degradation of Delta habitat during construction, operation, and maintenance activities.

3. Measures shall be taken to reduce impacts to juvenile spring-run chinook salmon from discharge monitoring activities.

4. Measures shall be taken to monitor DW operations and Delta hydrologic conditions.

The USACE is responsible for DW compliance with the following non-discretionary terms and conditions that implement the reasonable and prudent measures described above:

1. Measures shall be taken to reduce the extent of entrainment and predation during DW diversion operations through the use of properly designed fish screens.

Terms and conditions:

a. The USACE shall ensure the final fish screen design and construction schedule is submitted to NMFS Southwest Region for review and acceptance prior to construction. At least 90 percent of the design shall be

submitted to NMFS at least two months prior to the completion of the design process.

b. The USACE shall ensure that a hydraulic monitoring program for evaluating the performance of the fish screens and conformance with NMFS criteria is submitted to NMFS Southwest Region for review at least two months prior to the start of operations.

c. The USACE shall ensure the fish screens are adequately operated and maintained by submitting to NMFS a proposed operations and maintenance plan which includes:

   i. periodic underwater inspections;
   ii. periodic hydraulic measurements; and
   iii. periodic assessments of screen performance - component reliability, component durability, and screen-cleaning system effectiveness.

d. The USACE shall ensure that DW annually submits a log record to NMFS Southwest Region that documents compliance with measures 1-3 above.

2. **Measures shall be taken to reduce degradation of Delta habitat during construction, operation, and maintenance activities.**

Terms and conditions:

a. Riparian vegetation and/or SRA lost or damaged during construction or maintenance shall be mitigated by adherence to the "Guidelines for Revegetation" in Appendix 3.

b. Levee maintenance and bank protection activities shall adhere to the material guidelines described in Appendix 4.

c. Steel pilings and sheetpile may not be treated with chemical antifouling products.

d. Wood piles, or wood cores within concrete piles, may not be creosote-treated wood or chromated copper arsenate pressure-treated wood.

3. **Measures shall be taken to reduce impacts to juvenile spring-run chinook salmon form discharge monitoring activities.**

Terms and conditions:

a. Captured chinook salmon shall be handled with extreme care and kept in cool local water to the maximum extent possible during the sampling and processing procedures. Artificial slime products or anesthetics may be used to reduce physiological or osmotic stresses. Chinook salmon handled our-of-water for the purpose of recording biological information shall be anesthetized, when necessary, to prevent mortality. Anesthetized fish shall be allowed to recover (e.g. in a recovery bucket) before being released. Fish that are simply counted shall remain in water but do not need an anesthetic. All captured salmonids shall be returned to the water as soon as possible.

b. With gear that capture a mixture of species, chinook salmon shall be removed, processed first, and returned to the water as soon as possible.

c. Identification of the listed juvenile fish authorized to be captured and handled by this permit shall be based on NMFS-approved size criteria until other identification methods are formally approved by NMFS.

d. The following information shall be collected on each fish identified as a spring-run chinook salmon in the field:

i. location of capture, including near shore habitat type and water stage;
ii. date and time of capture;
iii. fork length; and
iv. fish condition, including abrasions, or other obvious injuries or scale losses,

This information shall be submitted to NMFS as a part of the weekly reports described below.

e. Any spring-run chinook salmon mortalities shall be placed in labeled whirl-pak bags and promptly frozen. Labels shall include the date/location of capture and the fork length of the fish. NMFS shall be notified as soon as soon as possible of any spring-run chinook salmon mortalities.

f. An annual report of DW operations shall include:

i. a description of the total number of spring-run chinook salmon taken, the manner of take, and the dates and locations of take, the

condition of spring-run chinook salmon taken, the disposition of spring-run chinook salmon in the event of mortality, and a brief narrative of the circumstances surrounding injuries or mortalities; and

ii. this report shall be submitted to the addresses given below.

4. Measures shall be taken to monitor DW operations and Delta hydrologic conditions.

Terms and conditions:

a. The USACE shall ensure that DW develops a comprehensive monitoring plan designed to collect the hydrologic and project operational information described below in i-vi. This monitoring plan shall be submitted to NMFS Southwest Region for review and approval prior to its implementation. The results of this monitoring program will be used to determine if the DW project is affecting spring-run chinook salmon to an extent not previously considered. The USACE, in coordination with DW, shall provide weekly monitoring reports of diversions and discharges to NMFS. These reports shall include the following information:

i. daily diversions at each intake siphon station on the reservoir and habitat islands;
ii. daily discharges at each discharge station on the reservoir and habitat islands;
iii. daily amount of DW discharged water exported at the CVP and SWP pumping plants;
iv. daily average QWEST;
v. net flow in cfs in the Old and Middle Rivers north of the CVP/SWP pumping plants; and
vi. daily receiving water temperatures and dissolved oxygen conditions and resultant changes to those conditions from DW discharges.

b. The USACE, in coordination with DW, shall summarize the above weekly reports into an annual report of the DW project operations and Delta hydrological conditions for the previous water year (July 1-June 30) for submission to NMFS by September 30 of each year.

c. All weekly and annual reports shall be submitted by mail or fax to:

i. Regional Administrator
Southwest Region, NMFS
501 West Ocean Boulevard, Suite 4200
Long Beach, California, 90802
Fax: (562) 980-4027

ii. Mr. Mike Aceituno
NMFS, Sacramento Field Office
650 Capitol Mall, Suite 6070
Sacramento, California, 95814
Fax: (916) 498-6697

VII. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. These "conservation recommendations" include discretionary measures that the USACE can take to minimize or avoid adverse effects of a proposed action on a listed species or critical habitat or regarding the development of information. In addition to the terms and conditions of the Incidental Take Statement, NMFS provides the following conservation recommendations that would reduce or avoid adverse impacts on the Central Valley spring-run chinook salmon ESU:

5. The USACE should encourage the use of levee maintenance designs that would increase and enhance the quantity and quality of riparian and shaded riverine aquatic habitat.

6. The USACE should support, through funding and other means, studies which evaluate juvenile salmonid rearing and migratory behavior in the Sacramento/San Joaquin Delta, including the effects of various water management operations on juvenile survival and behavior.

VIII. Reinitiation of Consultation

Reinitiation of formal consultation is required if there is discretionary Federal involvement or control over the action and if (1) the amount of extent of taking specified in any incidental take statement is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the actions subsequently modified in a manner that causes an effect to the listed species that was not considered in the biological opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

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Attachment 1.

Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA)

ESSENTIAL FISH HABITAT CONSERVATION RECOMMENDATIONS[4]

The Pacific Fisheries Management Council has recommended an EFH designation for the Pacific salmon fishery, and is awaiting approval by the Secretary of Commerce. However, if approval occurs before this project has been finalized, the U.S. Army Corps of Engineers (USACE), in cooperation with Delta Wetlands (DW), must provide a detailed response in writing describing the measures proposed by Delta Wetlands for avoiding, mitigating, or offsetting the impacts of the project on EFH.

I. IDENTIFICATION OF ESSENTIAL FISH HABITAT

The geographic extent of freshwater essential fish habitat (EFH) for the Pacific salmon fishery is proposed as waters currently or historically accessible to salmon within specific U.S. Geological Survey hydrologic units (Pacific Fisheries Management Council 1999).

EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting the definition of essential fish habitat, "waters" includes aquatic areas and their associated physical , chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means habitat required to support a sustainable fishery and a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle. For the Sacramento-San Joaquin Delta, the aquatic areas that may be identified as EFH for salmon are within the hydrologic unit map numbered 18040003 (titled San Joaquin Delta).

Historically, the Sacramento-San Joaquin Delta, has served as a migratory route for immigrating adult winter, spring, and fall-run chinook salmon (*Oncorhynchus tshawytscha*) to their spawning habitat, and for rearing and emigration of juveniles returning to the ocean (Yoshiyama et al. 1996). Within the Central Valley of California, populations of winter and spring-run chinook salmon have declined significantly as a result of habitat degradation due to dams, water diversions, and placer mining, as well as past and present land-use practices. The fall-run has been reduced, however to a lesser extent than the winter-run and spring-runs (Myers 1998). Recent estimates find that fall-run chinook have declined between 85 percent to 90 percent (Rich and Loudermilk 1991; USFWS 1995) of the population levels which existed in the 1940's. Fall-run chinook spawning population estimates from the Stanislaus, Tuolumne and Merced Rivers from 1974 to 1991 show both rising and descending trends lasting for several years (Kano 1996, 1998). Factors limiting salmon populations include low instream flows, high water temperature, reversed flows in the Delta (drawing juveniles into large diversion pumps), loss of fish into unscreened agricultural diversion, predation (especially by warm-water fish species), and lack of

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[4]The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) set forth new mandates for the National Marine Fisheries Service (NMFS) and federal action agencies to protect important marine and anadromous fish habitat. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding potential adverse effects of their actions on EFH, and respond in writing to NMFS "EFH Conservation Recommendations."

rearing habitat (Kondolf et al., 1996a, 1996b). In addition to direct losses caused by the entrainment or entrapment of fish at diversions, withdrawals of water affect both the total volume of water available to salmon and their prey, as well as the seasonal distribution of flows. Consequently, migration may be altered, changes to sediment and large woody debris transport and storage, altered flow and temperature regimes, pollution, and water level fluctuations may result (Dettman et al. 1987; CACSST 1988).

LIFE HISTORY AND HABITAT REQUIREMENTS

General life history information for chinook salmon is summarized below. Further detailed information on chinook salmon ESUs are available in the NMFS status review of chinook salmon from Washington, Idaho, Oregon, and California (Myers et al. 1998), and the NMFS proposed rule for listing several ESUs of chinook salmon (NMFS 1998).

Central Valley fall-run chinook enter the Sacramento and San Joaquin Rivers from July through April and spawn from October through December (USFWS 1998) with spawning occurring from October through December. Peak spawning occurs in October and November (Reynolds et al. 1993). Chinook salmon spawning generally occurs in swift, relatively shallow riffles or along the edges of fast runs at depths greater than 6 inches, usually 1-3 feet to 10-15 feet. Preferred spawning substrate is clean loose gravel, Gravels are unsuitable for spawning when cemented with clay or fines, or when sediments settle out onto redds reducing intergravel percolation (NMFS 1997).

Egg incubation occurs from October through March, and juvenile rearing and smolt emigration occurs from January through June (Reynolds et al. 1993). Shortly after emergence from their gravel nests, most fry disperse downstream towards the Delta and estuary (Kjelson et al. 1982). The remainder of fry hide in the gravel or station in calm, shallow waters with bank cover such as tree roots, logs, and submerged or overhead vegetation. These juveniles feed and grow from January through mid-May, and emigrate to the Delta and estuary from mid-March through mid-June (Lister and Genoe 1970). As they grow, the juveniles associate with coarser substrates along the stream margin or farther from shore (Healey 1991). Along the emigration route, submerged and overhead cover in the form of rocks, submerged aquatic vegetation, logs, riparian vegetation, and undercut banks provide food, shade and protect juveniles and smolts from predation. These smolts generally spend a very short time in the Delta and estuary before entry into the ocean.

In contrast, the majority of fry carried downstream soon after emergence are believed to reside in the Delta and estuary for several months before entering the ocean (Healey 1980, 1982; Kjelson et al. 1982). Principal foods of chinook while rearing in freshwater and estuarine environments are larval and adult insects and zooplankton such as *Daphnia,* flys, gnats, mosquitoes or copepods (Kjelson et al. 1982), stonefly nymphs or beetle larvae (Chapman and Quistdorff 1938) as well as other estuarine and freshwater invertebrates. Whether entering the Delta or estuary as a fry or juvenile, fall-run chinook depend on passage through the Sacramento-San Joaquin Delta for access to the ocean.

II. PROPOSED ACTION.

The proposed action is described in Part II of the preceding Biological Opinion for the threatened Central Valley spring-run chinook salmon ESU and its critical habitat, as well as critical habitat for the threatened Central Valley steelhead ESU.

III. EFFECTS OF THE PROJECT ACTION

The Sacramento-San Joaquin Delta is of vital importance to the migration of adult and juvenile chinook salmon. In addition, the majority of the fall-run chinook salmon rely on the Delta and estuary for rearing that will prepare them for entry and survival in the ocean. As such, it functions as a portion of the habitat necessary to support a sustainable population. The presence and operation of DW's reservoir and habitat islands can interrupt the EFH habitat functions by reducing the quantity and quality of rearing, feeding, migration and sheltering habitat.

It is anticipated that DW operations will alter the flows in the Sacramento-San Joaquin Delta throughout the year resulting in reduced feeding and rearing success and reverse flows that impede migration. Discharged water will likely affect water quality by increasing temperatures and pollutants, and decreasing dissolved oxygen levels. Riparian and Shaded Riverine Aquatic (SRA) habitats are expected to be lost as a result of levee maintenance, maintenance and construction of DW facilities (pump stations), and construction of boat docks. These actions are expected to reduce rearing and feeding opportunities for juvenile fall-run chinook salmon by removing or otherwise destroying riparian and SRA habitat, increasing pollution input from boats, and creating holding habitat for predators. Kondolf et. al. (1996a) notes that warm-water predators tend to concentrate around artificial structures such as irrigation diversion structures. Lastly, the monitoring of delta smelt may result in the incidental capture of fall-run chinook salmon.

IV. CONCLUSION

Upon review of the effects of the DW reservoir island project, NMFS believes that the operation of the Delta Wetlands project imposes an adverse affect on the potential EFH of fall-run chinook in the project area of the Sacramento-San Joaquin Delta.

V. EFH CONSERVATION RECOMMENDATIONS

NMFS recommends that Reasonable and Prudent Measures Numbers 1, 2, 3, and 4, and their respective Terms and Conditions listed in the Incidental Take Statement prepared for the Central Valley spring-run chinook salmon ESU in the preceding Biological Opinion be adopted as EFH Conservation Recommendations. In addition, four additional EFH Conservation Recommendations are provided below. These recommendations are provided as advisory measures.

7. The USACE and DW should report annually to NMFS on the volumes of water diverted onto each of the reservoir and habitat islands, as well as the volumes of water discharged back into the Delta.

8. DW should curtail all diversion if any fish screen, or part thereof, is damaged or removed for maintenance or repair and would allow diversion of unscreened water.

9. The USACE and DW should monitor the construction area and implement adequate control measures to avoid or minimize sediment, turbidity and pollutant input into the Delta during construction and maintenance operations.

10. The USACE and DW should report annually on the progress and success of the restoration of the 200 acres of shallow water habitat, and its benefits to fall-run chinook salmon.

VI. U.S. ARMY CORPS OF ENGINEER'S STATUTORY REQUIREMENTS

The Magnuson-Stevens Act and Federal regulations (50 CFR § 600.920) to implement the EFH provisions of the MSFCMA require federal action agencies to provide a written response to EFH Conservation Recommendations within 30 days of its receipt. Because the EFH designations for Pacific salmon have yet to be approved, this regulation does not apply until approved by the Secretary of Commerce, at which time the 30 day period will commence. It is anticipated that the Secretary will approve this ESA by September 27, 2000. A preliminary response is acceptable if final action cannot be completed within 30 days. Your final response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. If your response is inconsistent with our EFH Conservation Recommendations, the USACE must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

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Appendix 1. Proposed mitigation package for impacts to listed species from the proposed operations of the DW project.

This narrative reflects final operations criteria for the Delta Wetlands (DW) project that would take the place of the operations criteria previously proposed by Jones & Stokes Associates (JSA) on March 1, 1996. These operations criteria are intended to ensure that the DW project operations do not jeopardize the continued existence of delta smelt, Sacramento splittail, winter-run chinook salmon, spring-run chinook salmon, or steelhead trout. DW expects that non-listed species will also benefit from these criteria and such criteria will replace the related mitigation measures for fishery impacts proposed in the context of the CEQA/NEPA process.

Under these operations criteria, DW will be consistent with, and in many instances, exceed the conditions set forth in the State Water Resources Control Board's (SWRCB) 1995 Water Quality Control Plan for the Bay-Delta estuary. These revised operations criteria set forth multi-layered diversion and discharge parameters. In the instance where two or more conditions apply, the condition that is more restrictive on DW operations will control.

Additional restrictions apply if the Fall Mid-Water Trawl (FMWT) index shows a significant decline in delta smelt abundance. The FMWT Index refers to the most current four month (September-December) FMWT Index in place at the time of the intended diversion. A diversion prior to January can utilize either the previous year's FMWT Index or the partial FMWT Index for the months available, whichever is greater. Any changes in the FMWT Index calculation methodology will be adjusted so that the FMWT Index values applied herein can continue to be the standard for DW operations criteria.

A delta smelt FMWT Index measurement of less than 84 (FMWT<84) is new information under the reinitiation regulations (50 CFR § 402.16) and may require reinitiation of the United States Fish and Wildlife Service (USFWS) biological opinion. [#266, 45][5]

The following text represents the final language for replacement of Term I of the USFWS draft biological opinion: [#1]

> DW will not enter into any contractual agreement(s) which would provide for the export of more than 250,000 AF of DW water on a yearly (calendar year) basis. This provides for, but is not limited to, the following types of transfers: a c-user, short-term, opportunistic water transfer; a long-term water transfer; or any other such agreement, or contract for sale or transfer which is consistent with the March 6, 1995 biological opinion for the CVP/SWP, the SWRCB's 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (1995 WQCP), and the improved environmental baseline established under the March 6, 1995, CVP/SWP Section 7 consultation performed in conjunction with implementation of the *Principles for Agreement on Bay-Delta Standards Between the State of California and the Federal Government* (Bay-Delta Agreement). If such agreement(s) were determined to result in an adverse effect to delta smelt, delta smelt critical habitat or the Sacramento splittail in a manner or to an extent not previously identified, the contractual agreement(s) would be subject to some level of further environmental review.

DIVERSION MEASURES

DW shall limit diversions to the four project islands as set forth in the following measures:

5. In the period from September through November, DW shall not undertake its initial diversion to storage for the current water year until X2 is located at or downstream of Chipps Island. If DW's initial diversion to storage has not taken place by November 30, 1996, DW shall not undertake its

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[5] The number(s) in brackets are provided as a reference to the DW ESA Matrix which summarizes the final operations criteria as compared to the March 1, 1996 JSA proposed terms.

initial diversion to storage for the current water year until X2 is located at or downstream of Chipps Island for a period of ten (10) consecutive days. After the initial X2 condition is met, diversions shall be limited to a combined maximum rate of 5,500 cfs for five (5) consecutive days. Information documenting achievement of the X2 condition and resultant operational changes shall be submitted to the USFWS, NMFS, and CDFG within 24 hours of implementation of operational changes. [#2, 3, 4]

The location of X2 shall be defined as the average daily location of a surface water salinity of 2.64 EC, determined by interpolating the average daily surface EC measurements at existing Bay-Delta monitoring stations. Should the traditional X2 methodology be replaced, superseded, or become otherwise unavailable, DW shall follow whatever equivalent practice is developed, subject to approval of the resources agencies and notice to the responsible agencies.

6. In the period from September through March, DW shall not divert water to storage when X2 is located upstream (east) of the Collinsville salinity gauge. When the delta smelt FMWT Index is less than 239 (FMWT<239), DW shall not divert water to storage when X2 is located upstream of a point 1.4 kilometers (km) west of the Collinsville salinity gauge. [#5, 6, 7, 19]

7. In the period from October through March, DW shall not divert water to storage if the effect of DW diversions would cause an upstream shift in the X2 location in excess of 2.5 km. The resultant shift in X2 shall be determined by a comparison of the modeled estimates of the X2 location outflow, with and without the DW project, using a mathematical model, e.g., Kimmerer and Monismith equation. [#8, 9]

8. In the period from April through May, DW shall not divert water to storage. If the delta smelt FMWT index is less than 239 (FMWT<239), DW shall not divert water for storage from February 15 through June 30. [#10, 20]

9. DW diversions to storage shall be limited to the following percentage of available surplus water as derived pursuant to the 1995 WQCP (e.g., E/I ratio, outflow). [#13]

Table 1. Surplus Availability

Month	FMWT>239	FMWT<239
October	90%	90%
November	90%	90%
December	90%	90%
January	90%	90%
February 1-14	75%	75%
February 15-28	75%	NA
March	50%	NA
April	NA	NA
May	NA	NA
June	50%	NA
July	75%	75%
August	90%	90%
September	90%	90%

10. DW diversions to storage shall not exceed a percentage of the previous day's net Delta outflow rate (cfs), as set forth in the following table: [#11, 23]

Table 2. Outflow Diversion Limit

Month	Percent Outflow[6]	
	FMWT>239	FMWT<239
October	25%	25%
November	25%	25%
December	25%	25%
January	15%	15%
February 1-14	15%	15%
February 15-28	15%	NA
March	15%	NA
April	NA	NA
May	NA	NA
June	25%	NA
July	25%	25%
August	25%	25%
September	25%	25%

11. In the period from December through March, DW diversions to storage shall not exceed the percentage of the previous day's San Joaquin River (SJR) inflow rate (cfs) for the maximum number of days, as set forth in the following table: [#12, 24]

Table 3. San Joaquin Diversion Limit

Month	Percent SJR Inflow[7]	
	FMWT>239	FMWT<239
Application[1]	15 days	30 days
December	125%	125%
January	125%	100%
February 1-14	125%	50%
February 15-28	125%	NA
March	50%	NA

12. DW shall implement a monitoring program to minimize or avoid adverse impacts of DW diversions to storage, as set forth below: [#15, 16, 21, 22]

    a. DW shall implement a monitoring program in accordance with the attached "Delta Wetlands Fish Monitoring Program."
    b. DW shall provide daily in-channel monitoring from December through August during all diversions to storage, except as provided below.
    c. DW shall provide daily on-island monitoring from January through August during all diversions to storage, except as provided below.

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[6] The percent of Delta outflow is calculated without consideration of DW diversions; therefore, the calculation could use the previous day's actual Delta outflow added to the previous day's DW diversions to yield an outflow value that would not include DW operations.

[7] The application of the SJR diversion limit is subject to a specific election on the part of the responsible fishery agencies for a maximum number of days, as specified above. The election to invoke the SJR diversion limit shall be based upon available monitoring data (e.g., project specific monitoring, FMWT data).

d. Monitoring shall not be required at a diversion station if the total diversion rate at the station is less than 50 cfs and the maximum fish screen approach velocity is less than 0.08 fps (e.g., topping-off)

e. DW shall reduce the diversions at a diversion station to 50% of the previous day's diversion rate during the presence of delta smelt. Should delta smelt be detected on the first day of diversions to storage, the diversion rate shall be immediately reduced by 50%. This reduced diversion rate will remain in place until the monitoring program no longer detects the presence of delta smelt at the diversion station. For the purpose of this mitigation measure, delta smelt presence is defined as a two-day running average in excess of one (1) delta smelt per day at any reservoir diversion station. The definition of presence may be revisited from time to time as new information or monitoring techniques become available.

9. During periods when the Delta Cross Channel (DCC) gates are closed for fisheries protection purposes, between November 1 and January 31, and the inflow into the Delta is less than or equal to 30,000 cfs, DW shall restrict diversions onto the reservoir islands to a combined instantaneous maximum of 3,000 cfs. When the DCC gates are closed for fishery protection purposes and the inflow into the Delta is between 30,000 and 50,000 cfs, DW shall restrict diversions onto the reservoir islands to a combined instantaneous maximum of 4,000 cfs. At Delta inflows greater than 50,000 cfs, DW diversions shall not be restricted by the closure of the DCC for fishery protection purposes. For purposes of this provision, Delta inflow is defined in accordance with the 1995 WQCP. [#17]

10. Nothing in measures 1 through 9 above shall limit DW from diverting water onto Bacon Island and Webb Tract from June through October in order to offset actual reservoir losses of water stored on those islands, hereafter referred to as "topping-off" reservoirs. Daily topping-off diversions shall be subject to the following conditions: [#18, 25]

    a. Topping-off diversions shall not exceed the maximum diversion rate (cfs) and maximum monthly quantity (TAF) listed below:

Table 3. Maximum Topping-Off Diversion Rates

Month	June	July	August	September	October
Maximum diversion rate (cfs)	215	270	200	100	33
Maximum monthly quantity (TAF)	13	16	12	6	2

    b. Topping-off diversions shall occur through screened diversions with approach velocities less than 0.10 fps.

    c. A mechanism acceptable to USFWS, NMFS, and CDFG shall be devised and used by DW to document actual reservoir losses.

    d. The maximum topping-off diversion rates shown above shall be further limited by diversions onto the habitat islands. The maximum topping-off diversion rate and quantity shall be reduced by an amount equal to the habitat island diversions during the same period.

DISCHARGE MEASURES

DW shall limit discharges from the four project islands as set forth in the following measures:

1. In the period from April through June, DW shall limit discharges for export or rediversion from Bacon Island to one-half (50%) of the San Joaquin inflow measured at Vernalis. [#34]

2. In the period from January through June, DW shall not discharge for export or rediversion from Webb Tract. [#33]

3. DW shall not discharge for export or rediversion any water from the habitat islands. [#41]

4. In the period from February through July, DW discharges for export shall be limited to the following percentage of the available unused export capacity at the CVP and SWP facilities as derived pursuant to the 1995 WQCP. [#35, 36]

Table 5. Export Availability

Month	Bacon Island	Webb Tract
February	75%	NA
March	50%	NA
April	50%	NA
May	50%	NA
June	50%	NA
July	75%	75%

5. DW shall provide a quantity of "environmental water" for release as additional Delta outflow, as set forth in the following terms and conditions: [#38, 42]

   a. DW shall provide a quantity of environmental water equal to 10% of all discharges for export that occur in the period from December through June. If the delta smelt FMWT Index is less than 239 (FMWT<239), this environmental water percentage shall be increased to 20% of all discharges for export that occur in te period from December through June.

   b. Environmental water shall be released between February and June of the same water year as the discharge for export that generated the water and may not be banked for future use in subsequent water years.

   c. Habitat island discharges may be credited toward the environmental water quantities required above, if;

      i. habitat island discharges occur between February and June'
      ii. habitat islands discharges credits are limited to the net flow quantity (e.g., habitat discharge minus habitat diversion);
      iii. habitat island discharges occur during a period of time when 75% of the spacial distribution of the delta smelt population is located downstream of the discharge location, where the determination of spacial distribution is based on the most recent distribution data available (e.g., IEP);
      iv. the habitat island discharge rate does not vary on a daily basis more than 1% of the average gross flow rate in the adjacent channel, either upstream or downstream, when delta smelt are spawning in the area;
      v. DW makes a best effort to minimize fluctuations in daily discharge rates; and
      vi. the habitat island discharges are consistent with the HMP.

   d. Environmental water, less habitat island discharge credits, shall be discharged at the discretion of USFWS, NMFS and CDFG to maximize fishery benefits. Coordination of these discharges shall be performed by the CDFG Bay-Delta office.

6. DW shall implement a monitoring program to minimize or avoid adverse impacts of DW discharges for export, as set forth below: [#39, 40, 43, 44]

   a. DW shall implement a monitoring program in accordance with the "Draft Proposed Delta Wetlands Fish Monitoring Program."

b. DW shall provide daily in-channel monitoring from April through August during all discharges for export, except as provided below.

c. Monitoring shall not be required if the total discharge for export rate is less than 30 cfs.

d. DW shall reduce the discharge for export rate to 50% of the previous day's diversion rate during the presence of delta smelt. Should delta smelt be detected on the first day of discharges for export, the discharge rate shall be immediately reduced to 50%. This reduced diversion rate will remain in place until the monitoring program no longer detects a presence of delta smelt at the in-channel sampling sites. For the purpose of this mitigation measure, delta smelt presence is defined as a two-day running average in excess of one (1) delta smelt per day at the Old and Middle River sampling sites. The definition of presence may be revisited from time to time as new information or monitoring techniques become available.

e. DW shall provide for the monitoring either by contributing financial support commensurate with the proportionate share of DW exports to the Bay/Delta monitoring programs, or when no other monitoring is being conducted at appropriate sites, DW shall provide for direct monitoring in river channels as described above.

OTHER MEASURES

1. Fish Screen Design: [#49]

The DW fish screens will be generally consistent with the design presented in the DEIR/EIS except that DW shall maintain a 0.2 fps approach velocity for diversions. Final design elements and installation guidelines will be subject to approval by te responsible agencies with concurrence by the resource agencies. Final design, including a monitoring program to evaluate the performance criteria, will be submitted for approval at least 90 days prior to commencing operations.

2. Rearing and Spawning Habitat: [#50, 51]

Prior to construction, DW will secure a perpetual conservation easement (easement) for 200 acres of shallow-water aquatic habitat not currently protected by easement or covenant. The easement shall fully protect in perpetuity the shallow-water aquatic habitat. A management plan for the easement area shall be developed for the habitat covered by the easement, and shall be incorporated as an exhibit to the easement.

Additionally, DW shall provide to the USFWS documentation demonstrating adequate financing for the perpetual management of the habitat protected by the easement, consistent with the terms of this biological opinion and the management plan including;

a. adequate funds for the management of habitat protected in perpetuity by the conservation easement has been transferred to an appropriate third-party;
b. the third-party has accepted the funds; and
c. such funds have been deposited in an interest-bearing account intended for the sole purpose of carrying out the purposes of this easement.

The easement (along with a title report for the easement area) and management plan shall be approved by the USFWS prior to recordation. After approval, the easement and management plan shall be recorded in the appropriate County Recorders Office(s). A true copy of the recorded easement shall be provided to the USFWS within 30 days after recordation.

3. Boat Wake Erosion: [#53]

DW shall contribute $100.00 per year for each net additional berth beyond pre-project conditions added to any of the four project islands. These funds shall be in January 1996 dollars and shall be adjusted annually for inflation.

4. Aquatic Habitat: [#54]

The actual impact to aquatic habitat acreage for construction and operation of siphon and pumping facilities and waterside boat docks shall be verified prior to construction and mitigation shall take place on a 3:1 basis.

5. Temperature Limits: [#55]

DW shall implement a temperature program to minimize or avoid adverse impacts of DW discharges for export, as set forth below:

a. DW shall not discharge reservoir water for export if the temperature differential between the discharge and the adjacent channel temperature is greater than or equal to 20°F.
b. If the natural receiving water temperature of the adjacent channel is greater than or equal to 55°F and less than 66°F, DW discharges for export shall not increase the channel temperature by more than 4°F.
c. If the natural receiving water temperature of the adjacent channel is greater than or equal to 66°F and less than 77°F, DW discharges for export shall not cause an increase of more than 2°F.
d. If the natural receiving water temperature of the adjacent channel is greater than or equal to 77°F, DW discharges for export shall not cause an increase of more than 1°F.
e. DW shall develop temperature monitoring and implementation plans to ensure that the project does not adversely impact the channel temperature levels as described above. The monitoring plan shall include reservoir and channel temperature monitoring. The monitoring and implementation plans shall be completed after the project is permitted, but at least 90 days prior to project operations. The plans shall be submitted to the responsible agencies for approval with concurrence of the resource agencies.

6. DO Limits: [#56]

DW shall implement a dissolved oxygen (DO) program to minimize or avoid adverse impacts of DW discharges for export, as set forth below:

a. DW shall not discharge reservoir water for export if the discharge DO level is less than 6.0 mg/l without authorization from the resources agencies and notice to the responsible agencies.
b. DW shall not discharge reservoir water for export if the discharge would cause channel water DO levels to fall below 5.0 mg/l.
c. DW shall develop DO monitoring and implementation plans to ensure that the project does not adversely impact the channel DO levels as described above. The monitoring plan shall include reservoir and channel DO monitoring. The monitoring and implementation plans shall be completed after the project is permitted, but at least 90 days prior to project operations. The plans shall be submitted to the responsible agencies for approval with the concurrence of the resource agencies.

7. Incidental Entrainment Compensation: [#57]

Certain life stages of key fish species may not be effectively screened during periods of diversions for storage. DW will, therefore, sample DW diversions during the periods specified below and compensate for losses to selected target fish. DW diversions onto the reservoir islands will be sampled

for egg, larval, and juvenile life stages of the selected target fish. Those losses will be mitigated using a formula which ties measured losses with mitigation as specified below.

This provision covers entrainment of non-listed species, as well as delta smelt and splittail. Coverage of non-listed species is intended as a CEQA/NEPA mitigation measure and is only included here for ease of understanding.

Should on-island monitoring detect the presence of eggs, larvae, or juveniles during the months specified in the incidental entrainment monitoring guidelines, DW shall provide monetary compensation for incidental entrainment, as set forth in the following tables:

Table 6. Incidental Entrainment Monitoring Guidelines

Species and Life Stage	January	February	March	June	July	August
STRIPED BASS						
Larvae and Juveniles				✓	✓	✓
AMERICAN SHAD						
Larvae and Juveniles				✓	✓	✓
DELTA SMELT						
Larvae	✓	✓	✓	✓	✓	
Juveniles		✓	✓	✓	✓	✓
SPLITTAIL						
Larvae	✓	✓	✓	✓	✓	✓
Juveniles		✓	✓	✓	✓	✓
LONGFIN SMELT						
Eggs and Larvae	✓	✓	✓			
Juveniles	✓	✓	✓	✓	✓	✓

Table 7. Incidental Entrainment Compensation

Measured Density	Mitigation/TAF
10-999 eggs, larvae, and juveniles/AF	$500.00
1,000-5,000 eggs, larvae, and juveniles/AF	$750.00
>5,000 eggs, larvae, and juveniles/AF	$1,000.00

Should DW be unable to perform on-island monitoring, the maximum mitigation compensation will be assumed, unless waved or modified by the responsible agencies, with concurrence of the resource agencies. Funds are in January 1996 dollars and shall be adjusted annually for inflation. Monetary reimbursement shall be deposited into a mitigation fund on a semi-annual basis. The use of the mitigation funds shall be at the discretion of the resource agencies (e.g., CDFG Bay-Delta office) but shall be used to the fullest extent possible to plan and implement actions that improve habitat for the target species in the Estuary.

8. Construction Period: [#60]

All construction activities taking place in the tidal waters of the adjacent channels or impacting a tidal water habitat shall occur between June and November.

Appendix 2. Baseline and SW Operations Conditions
September through May
70 Year Simulation (JSA 1996)

		CVP/SWP Export Levels	QWEST	Delta Outflow	Old and Middle Rivers Flow
September	Baseline	7,147	-540	4,951	-6,660
	DW	7,411	-800	4,691	-6,924
October	Baseline	8,695	-456	7,578	-9,300
	DW	9,019	-1,062	6,972	-9,355
November	Baseline	9,107	-3,212	11,287	-7,597
	DW	9,127	-3,902	10,597	-7,616
December	Baseline	10,138	-1,848	22,257	-8,216
	DW	10,229	-2,241	21,864	-8,307
January	Baseline	11,025	570	34,981	-8,176
	DW	11,226	0.1	34,410	-8,197
February	Baseline	10,487	4,011	47,215	-6,861
	DW	10,568	3,542	46,746	-6,950
March	Baseline	9,420	3,450	38,703	-6,252
	DW	9,456	3,423	38,676	-6,288
April	Baseline	6,666	3,614	25,665	-6,219
	DW	6,753	3,655	25,707	-6,306
May	Baseline	6,191	1,914	17,458	-6,418
	DW	6,314	1,950	17,494	-6,540

Appendix 3. Guidelines for Revegetation of Woody Riparian and Shaded Riverine Aquatic Habitat

NMFS anticipates that adherence to these guidelines will result in 'no net loss' of riparian vegetation or Shaded Riverine Aquatic (SRA) habitat within the project area.

1. All remaining, natural woody riparian or shaded riverine aquatic (SRA) habitat shall be avoided or preserved to the maximum extent practicable.

2. Re-planting ratios for woody riparian and SRA shall replace lost habitat at a ratio of 3 to 1 (3:1).

3. Exposed soil shall be seeded with an appropriate assemblage of native grasses to aid in the stabilization of levee soil to minimize erosion.

4. Species chosen for replanting should reflect native species lost during the permitted activity or native species usually found in the riparian ans SRA zones of the project location.

5. Plantings should be done during the optimal season for the species being planting. Therefore, completion of the entire mitigation plan may not occur at the same time as the permitted activity.

6. Maintenance plans for revegetated sites should continue for at least three growing seasons to allow the vegetation to establish and insure that they are successful.

7. Remediation plans should be prepared in the event of a planting failure.

Appendix 4. Material Guidelines for Levee Maintenance and Bank Stabilization Projects

These guidelines should be applied to all bank stabilization and levee maintenance projects.

8. No petroleum products such as asphalt may be used.

9. Concrete or other similar rubble shall be free of trash or reinforcement steel.

10. If anchoring and stabilizing fabrics (geotextiles, armorflex, etc.) Are used, they shall be slit in appropriate locations to allow for plant root growth.

11. No fill material other than clean, silt-free gravel or river rock shall be allowed to enter the live stream.

12. When possible, hard points, fish groins, or tethered trees should be incorporated into the levee or bank protection design.

Protest Dismissal Agreement Between Delta Wetlands Properties and East Bay Municipal Utility District

Resumed Water Rights Hearing for the Delta Wetlands Project

Before The

State Water Resources Control Board

(October 2000)

East Bay Municipal Utility District

PROTEST DISMISSAL AGREEMENT BETWEEN DELTA WETLANDS PROPERTIES AND EAST BAY MUNICIPAL UTILITY DISTRICT

EBMUD Exhibit No. 6

PROTEST DISMISSAL AGREEMENT BETWEEN DELTA WETLANDS PROPERTIES AND EAST BAY MUNICIPAL UTILITY DISTRICT

This Protest Dismissal Agreement is entered into and effective this 15th day of Sept. 2000, by and among Delta Wetlands Properties ("Delta Wetlands") and the East Bay Municipal Utility District ("EBMUD").

RECITALS

WHEREAS, Delta Wetlands has applied to the State Water Resources Control Board to appropriate water pursuant to Application Nos. 29062, 29066, 30268 and 30270 and petitions for change thereto ("Delta Wetlands Applications");

WHEREAS, EBMUD filed with the State Water Resources Control Board a protest of the Delta Wetlands Applications, said protest based upon (a) fishery and (b) levee and Mokelumne Aqueduct security grounds;

WHEREAS, the State Water Resources Control Board has conducted a hearing on the Delta Wetlands Applications and will resume the hearing on October 10, 2000;

WHEREAS, EBMUD has appeared as a protestant and an interested party in the hearing on the Delta Wetlands Applications;

WHEREAS, Delta Wetlands and EBMUD desire to resolve issues between them regarding the Delta Wetlands Applications;

WHEREAS, EBMUD has implemented and continues to implement a comprehensive program to protect and enhance the lower Mokelumne River anadromous fishery; to further protect that fishery, EBMUD and Delta Wetlands wish to ensure that Delta Wetlands implements measures to minimize potential Delta Wetlands Project impacts upon that fishery;

WHEREAS, Delta Wetlands wishes to ensure the security of its Bacon Island and Webb Tract reservoir island levees and seepage control systems;

WHEREAS, EBMUD owns and operates the Mokelumne Aqueducts, which convey water across the Delta to supply EBMUD's East San Francisco Bay service area with approximately 95% of its water;

WHEREAS, Bacon Island, a proposed reservoir island of the Delta Wetlands Project, is located just north of and adjacent to the Mokelumne Aqueducts as they pass through the Delta;

WHEREAS, EBMUD wishes to ensure that the Bacon Island levees are secure and do not fail and that the levees on adjacent islands around Bacon Island are not damaged by the Project, either of which EBMUD contends could damage or destroy the Mokelumne Aqueducts; and

WHEREAS, EBMUD wishes to ensure that all seepage from Delta Wetlands' reservoir operations on Bacon Island to neighboring islands is controlled to prevent damage to the Mokelumne Aqueducts;

NOW, THEREFORE, the parties agree as follows:

1. Delta Wetlands and EBMUD agree to present Attachment A, Fisheries Terms and Conditions, Attachment B, Geotechnical Terms and Conditions, and Attachment C, Delta Wetlands Seepage Control Plan, to the State Water Resources Control Board and to support inclusion of those terms and conditions in any and all permits or licenses issued by the State Water Resources Control Board for the Delta Wetlands Project, including any permits or licenses issued pursuant to Application Nos. 29062, 29066, 30268 and 30270.

2. EBMUD agrees not to oppose the issuance of water right permits or licenses to Delta Wetlands pursuant to the Delta Wetlands Applications and agrees to withdraw its protest on the condition that the terms and conditions contained herein as Attachments A, B and C are included in such permits and licenses where applicable.

3. Whether or not the State Water Resources Control Board includes the terms and conditions contained in Attachments A, B and C, Delta Wetlands and its successors shall be subject to and comply with the terms, conditions and requirements of Attachments A, B and C, including the procedures regarding the Design Review Board and the Monitoring and Action Board.

4. At the resumed water rights hearing on its applications, Delta Wetlands will offer this Agreement into evidence as part of its submission to the State Water Resources Control Board.

5. EBMUD may elect to participate in the Delta Wetlands Project Fishery Technical Advisory Committee. Delta Wetlands shall notify the Department of Fish and Game that EBMUD may participate on the Technical Advisory Committee and is to be provided notice of all Technical Advisory Committee meetings and discussions.

6. This Agreement shall be binding upon and inure to the benefit of the successors in interest and legal representatives of the respective parties.

7. All changes or modifications to this Agreement shall be in writing and signed by EBMUD and Delta Wetlands or their successors.

8. The signatories hereto represent that they are authorized to enter into this Agreement on behalf of the party for whom they sign. This document may be executed in duplicate originals.

DELTA WETLANDS PROPERTIES, an Illinois general partnership

By: KLMLP, L.P., a Delaware limited partnership, Special Partner

By: ZKS Real Estate Partners, LLC, a Delaware limited liability company, its authorized agent.

Dated: Sep 7, 2000

By _____
Frederick L. Stephens, President

EAST BAY MUNICIPAL UTILITY DISTRICT

Dated: 9/14/00

By _____
Dennis M. Diemer, General Manager

ATTACHMENT A
FISHERIES TERMS AND CONDITIONS

Webb Tract Operations

From January 1 to June 30, Permittee's Webb Tract operations shall be in accordance with the following diversion protocol:

1. Diversions to storage shall be made through the southeastern siphon station, except that;

2. Only after the southeastern station siphon is operating at full capacity, or in excess of 90% of full capacity due to maintenance and repair, may diversions to storage be made through the northeastern siphon station;

3. Any reductions in diversions to storage shall first be accomplished by curtailing diversions at the northeastern siphon station. Only after diversions to storage at the northeastern siphon station are reduced to less than 50 cfs shall reductions in diversions begin at the southeastern station.

4. Permittee may operate the northeastern siphon station only when diversions through the southeastern siphon station are projected to be insufficient to completely fill storage on Webb Tract within 30 days. Permittee shall then operate the northeastern siphon station at or below the rates projected to fill said storage by the end of this same 30-day period. Permittee shall report Webb Tract diversion rates and storage amounts to the Technical Advisory Committee on an annual and monthly basis, in accordance with the provisions outlined in the Water Quality Management Plan or other applicable terms and conditions.

5. This diversion operations protocol is not applicable (1) if the U.S. Fish and Wildlife Service ("USFWS") determines that delta smelt eggs, larvae, juvenile or adult life stages are found at the Webb Tract southeastern siphon monitoring stations, as set forth in the USFWS Final Biological Opinion, or (2) if the 3-day running average of salinity or dissolved organic carbon ("DOC") at the northeastern siphon station is more than 10% lower than the 3-day running average of salinity or DOC at the southeastern siphon station. This 10% salinity/DOC exception to the protocol is not expected to occur more than once every five years. If, however, this 10% salinity/DOC exception occurs more frequently than once every five years, then the diversions at the northeastern siphon station resulting from this exception may not exceed 25 thousand acre feet per year nor exceed a diversion rate of 1,375 cfs, without express written authorization from EBMUD. In the event that this salinity/DOC exception is triggered, Permittee shall reimburse EBMUD up to an additional $5,000 as provided and pursuant to paragraph 16 set forth below.

6. The diversion operations protocol is not applicable during routine repairs and maintenance of the southeastern siphon station, with such exception limited to a maximum of three days per month.

7. Any additional siphons or screening capacity constructed by Permittee will also be subject to the diversion protocol. Any such additional siphons or screening capacity will be added to the southeastern siphon station whenever possible.

Siphon Removal

8. Permittee shall limit the number of existing siphons on Bouldin Island to no more than 14. This will require Permittee to remove a number of existing siphons. This reduction shall be applied uniformly around the island. All remaining siphons shall be screened as set forth in the USFWS' Final Biological Opinion.

9. Permittee shall limit the number of existing siphons on Webb Tract to no more than 7. This will require Permittee to remove a number of existing siphons. This reduction shall be applied uniformly around the island, except that at least 50% of the existing siphons along the San Joaquin River shall be removed so that no more than 4 siphons remain on the San Joaquin River. All remaining siphons shall be screened as set forth in the USFWS' Final Biological Opinion.

10. Permittee shall complete the above-referenced siphon removal prior to beginning diversions on Webb Tract under Permittee's new water rights. Permittee shall provide EBMUD with written notice of removal within thirty days of completion of siphon removal.

Boat Docks

11. Permittee shall limit the addition of new boat docks on the exterior of Bouldin Island to no more than 150. New boat docks on the Mokelumne River shall be limited to no more than 75.

12. Permittee shall limit the addition of new boat docks on the exterior of Webb Tract to no more than 198. New boat docks on the San Joaquin River shall be limited to no more than 30.

13. The location of Permittee's new boat docks on Bouldin Island and Webb Tract shall be based on recommendations by the Technical Advisory Committee with consideration given to the proximity of the proposed new boat docks to proposed new shallow water habitat.

Webb Tract Fisheries Monitoring Program

From January 1 to June 30, Webb Tract diversions to storage from the northeastern siphon station that exceed 50 cfs shall require fishery monitoring as described below:

14. No later than January 1, February 1, and March 1 of each year, Permittee shall provide to EBMUD a monthly operations plan showing when diversions to Webb Tract and Bouldin Island are anticipated to take place for the subsequent four month period.

15. No less than three days prior to commencing diversions which exceed 50 cfs to Webb Tract or Bouldin Island, Permittee shall notify EBMUD of its proposed diversion.

16. In any year when Permittee operates its northeastern Webb Tract diversion station and EBMUD finds juvenile chinook salmon have begun outmigrating from the Mokelumne River as determined by a two-day running average of over 25 fish per day at Woodbridge Dam, Permittee will reimburse EBMUD up to $50,000 per year in year 2000 dollars (adjusted annually for inflation by the Consumer Price Index for All Items - All Urban Consumers for the San Francisco-Oakland-San Jose Metropolitan Statistical Area) for monitoring expenses and the cost to obtain any necessary permits for monitoring in the immediate vicinity of the northeastern Webb Tract diversion station and associated boat docks.

17. Monitoring shall be performed for the first five years of actual operation (these might not be consecutive years) of Permittee's northeastern Webb Tract diversion station. If the Mokelumne River juvenile anadromous fish are not present on the screens of the northeastern diversion structure or are not in the stomachs of predators in the immediate vicinity of the northeastern diversion structure during this period, then no further monitoring shall be required.[1] If, however, Mokelumne River juvenile anadromous fish are present on the screens of the northeastern diversion structure or in the stomachs of predators in the immediate vicinity of the northeastern diversion structure, this monitoring program and its associated mitigation (described in Paragraph 18, below) will continue until such time as the monitoring program fails to detect the presence of these fish for three consecutive years of operation.

18. If this monitoring program identifies that Mokelumne River juvenile anadromous fish are present on the screens of the northeastern diversion structure or in the stomachs of predators in the immediate vicinity of the northeastern diversion structure, Delta Wetlands will immediately reduce its diversions at the northeastern Webb Tract diversion station by 50% of the then current diversion rate, or down to an instantaneous diversion rate of 50 cfs, whichever is greater.

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[1]For purposes of this agreement, Mokelumne River juvenile anadromous fish are any juvenile salmonids bearing an adipose fin clip. In the event tagging techniques are modified by EBMUD, or others, that eliminates the ability to distinguish Mokelumne River juvenile anadromous fish, EBMUD shall notify Permittee and modify this definition to enable proper identification of the Mokelumne River juvenile anadromous fish.

ATTACHMENT B
GEOTECHNICAL TERMS AND CONDITIONS

Reservoir Island Design Review Board ("DRB")

1. Members:

   a. Number: Three.

   b. Qualifications: Registered professional civil engineers with experience providing engineering services in the Sacramento-San Joaquin Bay-Delta. At least one member shall be a geotechnical engineer.

   c. Appointed by: Delta Wetlands Properties ("DW" or "Permittee").

   d. While not members of the Design Review Board ("DRB"), parties such as EBMUD that hold property interests adjacent to Bacon Island or Webb Tract (the Project reservoir islands) or parties that could be substantially affected by the reservoir operations and have appeared in the DW water rights hearing, shall have the ability to participate in DRB meetings, comment on design, and shall be provided a copy of all DRB minutes so that such parties can monitor the design and construction of the Project reservoir islands.

2. Duties: Permittee shall submit Project reservoir island plans and specifications to the DRB. The DRB shall review and comment on the plans and specifications during staged design review and during construction for the Bacon Island and Webb Tract Project improvements, confirming that Project design meets the stated objectives of the Project description as defined in the 2000 Revised Draft Environmental Impact Report/Statement and the Delta Wetlands Seepage Control Plan (Attachment C), including but not limited to: levee factors of safety, wave protection for levees, levee slopes, seepage control, and monitoring programs. Comments of the DRB shall be provided to the SWRCB, Permittee, EBMUD, and to local reclamation districts adjacent to the Project reservoir islands.

3. Compensation: Members of the DRB are to be compensated by Permittee for their time, in an amount up to but not to exceed $300,000. The DRB shall cease to exist once its duties, as set forth in paragraph 2, are completed.

Reservoir Island Monitoring & Action Board ("MAB")

4. Members:

   a. Number: Three, with two alternates.

   b. Qualifications: The two primary members shall be registered professional civil geotechnical engineers with experience providing engineering services in the

Sacramento-San Joaquin Bay-Delta. The third member and the two alternate members shall be licensed professionals with experience in seepage in the Sacramento-San Joaquin Bay-Delta.

c. Appointment Process: The State Water Resources Control Board ("SWRCB") shall appoint one member and DW shall appoint one member. In the event the SWRCB does not so appoint one MAB member, then DW shall instead appoint that member after first meeting and conferring with EBMUD on the independence and objectivity of the proposed appointment and after allowing EBMUD an opportunity to object to the appointment. No appointment of this one MAB member shall be made over the objection of EBMUD. These two members ("primary members") shall appoint the third member and the two alternate members. Any party to the Delta Wetlands SWRCB hearing may provide suggestions to the SWRCB as to who to appoint to the MAB. Each of the MAB members shall be appointed for a term of four years. At the end of the four-year term, the same selection process will be used to select the MAB.

5. Term: The MAB shall be established prior to the first diversions to storage on Bacon Island or Webb Tract and shall continue thereafter for the duration of Project reservoir operations on Bacon Island and/or Webb Tract.

6. Compensation: Members of the MAB are to be compensated by Permittee for their time on an hourly basis. Such costs, including costs of reports which may be prepared and studies which may be undertaken by the MAB shall be part of the annual operation and maintenance costs of the Project.

7. Duties:

a. Permittee shall submit Project monitoring and seepage data to the MAB so that the MAB can fulfill its duties. During the first year of Project reservoir island operations, the MAB shall serve as a neutral technical engineering advisor and shall review monitoring and seepage data at each stage of initial reservoir filling. Following that initial filling, the MAB shall review monitoring and seepage data at a minimum of every three months during the remainder of the first year of Project reservoir island operation.

b. The MAB shall serve as a neutral technical engineering advisory panel, hearing and investigating identified problems purportedly caused by Permittee's reservoir operations, including but not limited to levee weakness, overtopping of levees, levee failure, scour at EBMUD's Mokelumne Aqueduct river crossings, and seepage. The MAB shall also issue Reports containing its recommendations on remedial actions to correct problems, as set forth in paragraph 14.

c. The terms of the Delta Wetlands Seepage Control Plan (Attachment C) may be adjusted over time by the SWRCB as set forth below. The SWRCB reserves jurisdiction over changes in the Delta Wetlands Seepage Control Plan to coordinate

or modify its terms for the protection of other legal users of water, fish, wildlife, instream beneficial uses, and the public interest as future conditions may warrant. The SWRCB delegates authority to the Executive Director of the SWRCB to take actions under this reservation of jurisdiction as set forth below.

(i) During the third year of Project operations, the MAB shall review the Delta Wetlands Seepage Control Plan to determine if changes in any of the Seepage Control Plan's terms are advisable. In its review, the MAB shall examine actual operation of the Project to date and any adverse effects of Project reservoir operations, including impacts on neighboring levees and islands. The MAB will base each of its recommended changes to Plan terms, if any, on its independent, professional judgment. At the conclusion of its review, the MAB shall issue a written list of its recommended changes, if any. The list shall be sent by the MAB to the SWRCB, Permittee, EBMUD, all Interested Parties who have notified Permittee as set forth in paragraph 9, and all parties to the Delta Wetlands SWRCB hearing ("Noticed Parties").

(ii) If Permittee, EBMUD, Noticed Parties and Interested Parties (as limited above) do not object to a change recommended by the MAB within 30 days of service of any proposed change, then the Executive Director of the SWRCB may approve the change without the need for a comment period or hearing. In the event of any objection, the SWRCB may only approve the change after it provides notice of and an opportunity to comment on the proposed change to Permittee, EBMUD, Noticed Parties and Interested Parties (as limited above). If requested by Permittee, EBMUD, a Noticed Party or an Interested Party (as limited above), the SWRCB may hold a hearing on the proposed change.

d. After its initial three-year review of the Delta Wetlands Seepage Control Plan as set forth above, the MAB may thereafter periodically review and change the terms of the Delta Wetlands Seepage Control Plan so long as the review and approval process set forth above is followed.

Dispute Resolution Procedure

8. Delta Wetlands and EBMUD set forth the following process to identify and remedy levee, seepage and related problems which may be caused by Project reservoir islands operations. The parties recognize, however, that in the event of an emergency, such as an imminent levee failure, there is a need for rapid action such that there may not be time for this process to take place. In the event of emergency, an Interested Party or reclamation district may notify Permittee of a problem by any available method.

9. Any entity or individual who may be injured by the reservoir operations of the Delta Wetlands Project ("Interested Party") may elect to seek a remedy through the Dispute Resolution Procedure set forth below. If such an Interested Party elects to utilize said Dispute Resolution Procedure, then the Interested Party shall notify Permittee and MAB in

writing of such election and shall be bound by all provisions set forth therein, including but not limited to paragraph 16.

10. Method of Notification: Except in cases of emergency, all notifications, determinations, completion notices, objections, and reports shall be in writing delivered by U.S. Mail, courier, messenger, facsimile or electronic mail. All written notifications, determinations, completion notices, objections, and reports must be signed by a registered engineer.

11. Notification of Problem: EBMUD, or any Interested Party that has elected to use the Dispute Resolution Procedure as set forth in paragraph 9, may notify Permittee of perceived problems caused by the Project, including but not limited to, indications of levee failure and/or seepage on Project reservoir islands or on adjacent islands. EBMUD or Interested Party shall hereafter be referred to as "Complainant."

    a. Contents of Notification: The Notification shall specify the type of problem identified, its location and when it was observed.

    b. Notification Sent to: The Notification shall be sent by Complainant to the SWRCB, Permittee, the MAB, and to the secretary of any reclamation district for land on which the identified problem is occurring.

12. Determination by Permittee: Upon receiving a written Notification pursuant to paragraph 11, Permittee shall investigate the problem. Within five working days of receiving said written Notification, Permittee shall provide a written Determination to the SWRCB, Complainant, the MAB, and to the secretary of any reclamation district to whom the Notification was sent.

    a. Contents of Determination: The Determination shall outline what actions Permittee took to investigate the identified problem, Permittee's conclusions as to the nature of the problem, an explanation of what remedial actions, if any, Permittee will take to correct the problem, and when any such remedial actions will be commenced and completed.

    b. Upon Permittee's completion of any such remedial actions, Permittee shall provide a written completion notice to the SWRCB, Complainant, the MAB, and the secretary of any reclamation district to whom the Notification was sent. The notice shall state what remedial actions were taken and when they were completed.

13. Objection to Permittee's Determination: In the event Complainant disagrees with all or part of Permittee's Determination, Complainant within five working days of receipt of Permittee's Determination, shall send to the SWRCB, Permittee, the MAB and to the secretary of any reclamation district to whom the Notification was sent, a written Objection to the Determination.

a. Contents of Objection: The Objection shall outline to which portions of the Determination Complainant objects and why. Complainant may also state its view of the problem and remedy.

14. MAB Report: Upon receipt of an Objection pursuant to paragraph 13, the MAB shall commence its own independent investigation of the matter. Permittee and/or Complainant may submit additional material to the MAB to assist in its investigation, so long as the other party is copied. If, in the opinion of the MAB, additional technical studies are necessary to its investigation, it may undertake or authorize such studies. The costs of any such studies shall be paid for as set forth in paragraph 6.

a. Within seven working days of receiving the written Objection, the MAB shall issue a written Report. Said Report shall be sent to the SWRCB, Permittee, Complainant and to the secretary of any reclamation district to whom the Notification was sent.

b. Contents of Report: The Report shall include the MAB's independent opinion on the nature of the problem, its recommendation on what remedial actions should be taken by Permittee to correct the problem, if any, and a schedule of when any such remedial actions should be commenced and completed by Permittee. The MAB shall only recommend remedial actions which address problems determined to be caused by Project reservoir operations though, if necessary, it may identify other causes only for explanatory purposes.

15. Permittee's Compliance with the Report: Permittee shall implement all recommended remedial measures listed in the MAB's Report by the deadlines included therein, and shall be solely responsible for the costs of said measures.

16. Frivolous Claims: If the Permittee believes the Complainant has filed a frivolous Notification pursuant to paragraph 11, then Permittee may, within fifteen days of receiving the MAB Report, request the MAB to determine whether the Notification by Complainant is totally and completely without merit (frivolous). If the Notification is determined to be frivolous, Complainant shall pay all costs and fees of investigating the claim incurred by the MAB.

17. Judicial Remedy: Nothing in these terms and conditions shall constitute a waiver of the rights of Permittee or Complainant to pursue judicial remedies in state court regarding an MAB Report.

Financial Assurances

18. The following four classes of financial assurances shall be required so long as the Project is owned by any party other than the state and/or federal government(s). In the event the Project is owned and operated by the state and/or federal government(s), then these provisions shall not apply. However, any governmental entity that purchases or leases the Project shall hold a financial reserve account for the Project that is sufficient to cover the annual costs of Project operations or shall provide equivalent assurances.

19. **Seepage and Monitoring Fund:** The parties wish to ensure that, prior to any diversions to storage on Bacon Island or Webb Tract in each and every year of Project operation, the Permittee have sufficient capital resources on hand to operate the seepage control and monitoring systems for the full year. To meet this objective, the following funding mechanism shall be utilized.

First Year of Operation. Prior to the first diversion to storage on a Project reservoir island, Permittee shall deposit, in an interest-bearing account in a financial institution licensed to do business in the State of California who will act as the escrow agent, with interest accruing to Permittee, $500,000 to be used for the first year's annual operating expenses of the Project's reservoir island seepage control and monitoring systems. Permittee may draw upon said monies over the course of the year only to cover routine incurred expenses for seepage control and monitoring on the two Project reservoir islands.

Following Years. Prior to the first diversion to storage on a Project reservoir island in each and every water year thereafter, Permittee shall deposit into said account a sum of money the MAB estimates, as provided below, will be required for the complete annual operating costs of the Project's reservoir island seepage control and monitoring systems for that upcoming water year. Permittee may draw upon said monies over the course of the water year only to cover routine incurred expenses for seepage control and monitoring on the two Project reservoir islands.

Estimate. No later than September 1 of each year, Permittee shall file with the MAB a written estimate of the amount of money required for the complete annual operating costs of the Project's reservoir islands seepage control and monitoring systems for the upcoming water year. (The water year shall be October 1 through September 30.) The MAB shall review that estimate and, in its own discretion, set an amount of money it estimates will be needed to operate the Project reservoir islands seepage control and monitoring systems for that upcoming water year. Said sum shall not be less than the prior year's actual seepage and monitoring costs. Permittee shall then deposit that amount of money in the designated account, as provided above.

Records. Permittee shall provide proof of deposit of the estimated annual seepage and monitoring costs to the MAB prior to the first diversion to storage on a Project reservoir island in each year of operation. Permittee shall maintain all books and records on the utilization of said account monies for each year of Project operation and shall submit to the SWRCB and MAB, no later than October 15 of each year, an accounting of how said monies were expended in the prior water year.

20. **Drawdown Fund:** The parties wish to ensure that, in the event Permittee abandons the Project or otherwise does not operate the Project after water has been diverted to storage on a Project reservoir island, there are sufficient capital resources on hand to empty the Project reservoir islands.

First Year of Operation. Prior to the first year of reservoir operations, Permittee shall deposit, in an interest-bearing account in a financial institution licensed to do business in the State of California who will act as the escrow agent, with interest accruing to Permittee, $1,000,000 to cover the expense of emptying the Project reservoir islands. Permittee may draw upon said monies over the course of the year to cover routine expenses of discharging water from the Project reservoir islands as part of normal operations.

Following Years. Prior to the first diversion to storage on a Project reservoir island in each and every water year thereafter, Permittee shall deposit into said account a sum of money the MAB estimates, as provided below, will be required for the complete annual operating costs of the Project's discharge operations for that upcoming water year. Permittee may draw upon said monies over the course of the water year only to cover routine incurred expenses for discharge of stored water on the two Project reservoir islands.

Estimate. No later than September 1 of each year, Permittee shall file with the MAB a written estimate of the amount of money required for the complete annual operating costs to discharge water from the Project reservoir islands for the upcoming water year. (The water year shall be October 1 through September 30.) The MAB shall review that estimate and, in its own discretion, set an amount of money it estimates will be needed to discharge water from the Project reservoir islands for that upcoming water year. Said sum shall not be less than the prior year's actual discharge costs. Permittee shall then deposit that amount of money in the designated account, as provided above.

Records. Permittee shall provide proof of deposit of the estimated annual discharge costs to the MAB prior to the first diversion to storage on a Project reservoir island in each year of operation. Permittee shall maintain all books and records on the utilization of said account monies for each year of Project operation and shall submit to the SWRCB and the MAB, no later than October 15 of each year, an accounting of how said monies were expended in the prior water year.

21. **Remedial Actions:** The parties wish to ensure that, in the event Permittee determines to take corrective actions in response to a Complainant's Notification or if the MAB recommends remedial actions to correct identified problems, Permittee will have sufficient capital resources on hand to implement those actions.

Prior to the first diversion to storage on a Project reservoir island, Permittee shall deposit, in an interest-bearing account in a financial institution licensed to do business in the State of California who will act as the escrow agent, with interest accruing to Permittee, $1,000,000. This fund shall be available for use by Permittee only to implement corrective actions in response to a Complainant's Notification or to implement remedial measures recommended by the MAB.

In the event this Remedial Action Fund is so used by Permittee, Permittee shall, prior to again diverting to storage on a Project reservoir island, deposit sufficient monies into said account so that its balance returns to its minimum required level. Its minimum required level shall be $1,000,000, as adjusted annually for inflation by the ENR Construction Cost Index

for San Francisco (ENR CCI-SF) for the life of the Project. In the event this Remedial Action Fund is not used by Permittee during ten years of reservoir operations, then such fund shall be canceled and the monies deposited shall revert back to Permittee.

Records. Permittee shall provide proof of deposit of the Remedial Action Fund to the MAB prior to the first diversion to storage on a Project reservoir island, and if the Remedial Action Fund is drawn upon, Permittee shall again provide proof of deposit of sufficient funds to maintain the balance at the minimum required level prior to again diverting to storage on a Project reservoir island. Permittee shall maintain all books and records on the utilization of said account monies for each year of Project operation and shall submit to the SWRCB and the MAB, no later than October 15 of each year, an accounting of how said monies were expended in the prior water year.

22. **Insurance:** The parties wish to ensure that in the event of damage caused by the Project, sufficient capital resources are available to reimburse damaged parties.

Permittee shall take out and maintain, during the life of the Project, General Liability Insurance that provides protection from claims that may arise from Project reservoir islands operations. Permittee shall annually submit certificates of said insurance to EBMUD. The policy shall not be cancelled or materially altered unless 30 days' written notice is given EBMUD. The amounts of insurance coverage shall not be less than $25,000,000/ Occurrence, Bodily Injury, Property Damage - General Liability.

ATTACHMENT C
DELTA WETLANDS SEEPAGE CONTROL PLAN

I. INTRODUCTION

A. Description of Seepage

The Delta Wetlands ("DW") Project consists of four islands. Water will be stored on the two reservoir islands (Bacon Island and Webb Tract) up to elevation +6 feet. On the habitat islands (Bouldin Island and Holland Tract), water levels will be managed for a range of crops and habitats, some of which include shallow flooding. DW intends to control groundwater in the vicinity of its reservoir islands in such a way that there is no seepage beyond that which would be produced by other uses of the DW reservoir islands currently allowed (such as intensive agriculture or shallow flooded wetlands). Controlling seepage to within these limits is referred to as "no net seepage impact".

The method by which a reservoir on Bacon Island and/or Webb Tract could create a seepage impact on an adjacent island is flow through a connecting sand aquifer extending beneath both islands. Seepage flowing from one island to the next will raise the hydrostatic head in the aquifer beneath the neighboring (receiving) island. The presence or absence of a connecting aquifer is not known at many locations. If there is a connecting aquifer and if seepage is occurring from a reservoir island through the aquifer to a neighboring island, the hydrostatic head in the aquifer beneath the neighboring island will rise and fall with the filling and emptying of the reservoir. DW will monitor the hydrostatic head in the aquifers beneath neighboring island levees to check that no seepage is occurring from DW Reservoirs. Several types of "wells" are used to control and monitor seepage. Their definition and relative location are shown on Figure C-1 (attached).

B. Groundwater Monitoring Wells

Two suites of groundwater monitoring wells will be installed.

To check whether the reservoir water level on Bacon Island or Webb Tract is affecting an adjacent island, Permittee will install seepage monitoring wells along a neighboring island's perimeter directly across from the Bacon Island and Webb Tract Reservoir islands.[1] These will be the primary tool for detecting seepage from a reservoir island. If water stored on a DW reservoir island creates added seepage toward a neighboring island, the increased hydrostatic head that would be part of the seepage can be measured in monitoring wells penetrating the aquifer transmitting the water.

To check the overall groundwater behavior in the Delta, unrelated to operation of the DW Project, a series of background monitoring wells will be installed at locations sufficiently far removed from the Bacon Island and Webb Tract reservoirs as to not be influenced by water storage

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[1]The installation of monitoring wells is subject to the approval of the neighboring island owner(s). If approval is unreasonably withheld, alternative locations will be utilized.

within the reservoirs. The measured groundwater levels will be normalized (as described below) and averaged to develop an overall characterization of the groundwater trends in the central portion of the Delta.

C. Pre-Project Baseline

To collect baseline[2] data on the overall groundwater system performance as it relates to agricultural practices or wetlands management, the groundwater monitoring wells (both seepage monitoring wells and background monitoring wells) will be monitored by DW continually for at least one year prior to the start of reservoir filling. The same measurements will be taken by DW year round, once the Project is implemented.

D. Detecting Seepage

To assess whether filling Bacon Island or Webb Tract may be impacting the groundwater level beneath neighboring islands, the groundwater levels in the seepage monitoring wells beneath adjacent islands will be compared by DW to the baseline records at those same locations. Concurrently, the overall groundwater performance of the Delta will be measured by DW in the background monitoring wells. Those locations showing increases above baseline range (adjusted for extreme variations in overall Delta groundwater performance), that coincide with filling the reservoir, will be the basis for suspending water diversion onto the nearby reservoir island. Details regarding how the various data will be compared are described in Section III set forth below. The above monitoring observations will be made on a continuing basis, allowing DW to observe the start of trends that may indicate possible seepage from the reservoirs. The goal of DW is to be proactive and to make needed groundwater control adjustments far in advance of the Diversion Suspension Limits.

E. Initial Stage Filling of Reservoirs

When the Project first begins to operate, water storage will be implemented on a vertical stage-filling basis. Water within the reservoir will first be brought to a fairly low level, not more than 25% of storage capacity, and held constant for a period of time until sufficient data are collected to verify that no net seepage impacts are occurring on neighboring islands. If impacts are found that require controlling measures, filling of the reservoir will be put on hold until appropriate measures can be brought on line so as to not cause additional risk to neighboring island levees. Such actions could include increasing the pumping capacity of interceptor wells, installing additional interceptor wells, installing relief wells on a neighboring island, and/or other mitigation that may be agreed upon among DW, the adjacent landowners, and the reclamation districts.

If impacts are not detected, the reservoir will be further filled to the next vertical stage (approximately 50% of reservoir capacity) and again held constant to allow adequate time for data collection and assessing of possible seepage impacts. This cycle of staged-filling, monitoring

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[2]"Baseline" data refer to data collected prior to the first filling of the reservoir islands. The baseline may be updated during subsequent years of no water storage on the reservoir islands.

seepage, assessing impacts, and correcting impacts will be repeated until the reservoir can be safely brought to full operational level with suitable seepage control measures in place.

F. Routine Operations

The reservoirs will commonly begin filling in late fall to early winter. Both prior to and during filling, the groundwater levels in the seepage monitoring wells will be carefully tracked by DW. The interceptor wells will begin to operate as the reservoir level is raised. Pumping rates will be increased as the pool elevation in the reservoir is raised. All this time, the seepage monitoring wells will be tracked and serve as a control for adjusting the interceptor well pumping rates. The interceptor wells will be pumped such that the water levels in the seepage monitoring wells are kept near the normal seasonal levels.

DW will continually evaluate the efficiency of the interceptor wells to verify that there is sufficient additional capacity to allow the pool elevation to continue to be raised. If the efficiency of a well drops off such that the ability of the well to pump greater volumes of water is in question, DW will redevelop the well to improve its efficiency prior to approaching the well's limits. If additional capacity is not readily available from an existing well, a new well can be drilled to increase the pumping capacity at the reservoir island's perimeter.

The reservoir pool elevation will lower as water is later exported into the adjacent slough or river. As the pool elevation decreases, the pumping rates from the interceptor wells will be gradually lowered, with the goal of keeping the water levels in the neighboring islands seepage monitoring wells near their normal seasonal levels.

During the period with little to no water storage, a thorough evaluation of the efficiency of the wells will be undertaken by DW to identify those wells that may show signs of decreasing efficiency and may be susceptible to overstressing during the following season's storage cycle. The need for additional wells will also be evaluated. To the extent practical, redevelopment of existing wells and installation of additional wells will occur during the off-season.

II. LOCATIONS OF GROUNDWATER MONITORING WELLS

A. Background Monitoring Wells

At least twenty-five (25) background monitoring wells will be sited by DW at an appropriate distance from the reservoir islands. These background monitoring wells will be at least one mile from a reservoir island and most likely will be greater than 11/2 miles from a reservoir island. Recommended typical locations of background monitoring wells are shown on Figure C-2. The purpose of these background monitoring wells is to monitor regional groundwater elevations beyond the reasonable influence of the DW reservoir islands.

B. Seepage Monitoring Wells

At least 100 seepage monitoring wells will be placed on or near levees directly opposite the perimeter of the reservoir islands. The five neighboring islands around the south half of Bacon

Island are Lower Jones Tract, Upper Jones Tract, Woodward Island, Orwood Tract and Palm Tract. Around the northern half of Bacon Island are Holland Tract, Little Mandeville Island (currently flooded), Mandeville Island and Mildred Island (currently flooded). Around Webb Tract are Bradford Island, Twitchell Island, Brannan/Andrus Island, Bouldin Island, Venice Tract, Mandeville Island, Franks Tracts (currently flooded), and Little Franks Tract (currently flooded).

Passing across Upper Jones Tract, Woodward Island and Orwood Tract is the Mokelumne Aqueduct, a critical structure. Flooding on any of the five neighboring islands (Lower Jones Tract, Upper Jones Tract, Woodward Island, Orwood Tract and Palm Tract) around the southern half of Bacon Island may increase the risk of service disruption for the aqueduct. The shortest distance between the levee on the southern half of Bacon Island and a neighboring island levee (centerline to centerline) is about 700 feet. A seepage monitoring well spacing of 1,500 to 2,000 feet on a neighbor island levee will provide essentially full coverage of a continuous aquifer at these distances. However, allowing for an importance or risk factor associated with the Mokelumne Aqueduct, DW will use minimum seepage monitoring well spacings of 500 to 1,000 feet for center-to-center levee distances of between 700 to 1,200 feet. For levees beyond a distance of 1,200 feet from a Bacon Island levee, seepage monitoring well spacing will be 1,500 to 2,000 feet. The approximate locations for seepage monitoring wells are shown on Figure C-3.

C. Other Water Level Monitoring

Reservoir stage recording stations will be established within Bacon Island and Webb Tract to document the water surface elevations in the reservoirs. A river stage recording station will be established on the outside perimeters of Bacon Island and Webb Tract to document the water surface elevations in the surrounding rivers and sloughs.

III. EVALUATION OF GROUNDWATER MONITORING WELL DATA

A. Collecting Data Prior to Filling Reservoir and Developing Reference Envelopes

Groundwater monitoring wells (both seepage and background monitoring wells) will be installed by DW at least one year prior to commencement of reservoir filling. Groundwater levels will be recorded using automatic data loggers, measuring and recording the groundwater elevation at least once each hour. The groundwater elevations recorded each day will be averaged to compute the mean groundwater elevation each day ("daily mean") at each groundwater monitoring well location (see Figure C-4). This "daily mean" value will be the primary data used by DW in assessing whether seepage impacts are occurring.

At least one year of groundwater elevation data will be collected from the groundwater monitoring wells prior to the filling of a DW reservoir island. These baseline data will be used as a measure of the initial conditions at these individual groundwater monitoring well locations.

Using the daily means as the data, the annual mean will be computed for each groundwater monitoring well (see Figure C-5). The daily means will be compared with the annual mean and the standard deviation of the difference between the daily means and the annual mean will be computed

for the baseline period. A reference envelope will be developed that is two standard deviations above and below the annual mean for each groundwater monitoring well.

B. Background Monitoring Wells

Data will be collected by DW from background monitoring wells over the same time period as data are collected for the seepage monitoring wells located directly across sloughs from the reservoirs. Daily means of the water level elevations will be calculated for each background monitoring well. Reference envelopes will be computed using at least one full year of pre-reservoir groundwater data to identify plus and minus two standard deviations relative to the annual mean.

After the two standard deviation reference envelopes are created for each background monitoring well for the baseline (pre-reservoir filling) period, subsequent daily mean data for each background monitoring well will be compared with its reference envelope, Figure C-6a. To normalize the data, the lower reference line value will be subtracted from the daily mean. The algebraic difference will then be divided by the height of the envelope (plus or minus two standard deviations). The daily mean for each background monitoring well will be reported as a percent of its envelope height, Figure C-6b. A normalized plot will be prepared comparing the current background groundwater data to the height of the plus or minus two standard deviation baseline envelope for the same well and presented as a percentage of its envelope, Figure C-6c.

The above computed normalized percentage results from each of the background monitoring wells will be combined with the results for all other background wells and averaged for each day. They will be plotted versus time, with the hydraulic head expressed as a percent of the background groundwater monitoring wells' reference envelopes, Figure C-6d. The intent of this last plot is to track general groundwater variations that may be occurring in the central portion of the Delta but that are unrelated to water stored by the Project.

DW anticipates that this plot will show increases in groundwater levels during sustained periods of locally heavy rainfall and low evapotranspiration and during higher water levels in the rivers and sloughs as a flood stage passes through. Many fields are flooded from mid-fall to winter for a variety of reasons. This shallow flooding will also be detected. Low background groundwater levels are expected during late spring through early autumn when evapotranspiration is high and rainfall negligible.

Individual seepage monitoring wells or groups of seepage monitoring wells showing similar responses to those indicated by the average background conditions will indicate that the individual seepage monitoring wells or groups of seepage monitoring wells are responding to the same regional conditions that are affecting the background monitoring wells.

C. Reservoir Stages

Reservoir stage will be measured by DW within the reservoir islands. The daily means of reservoir stage will be computed and recorded. The reservoir stage daily mean will be shown on a graph of pool elevation versus time, similar in format to the daily mean groundwater elevation plots for groundwater monitoring wells.

D. River and Slough Stages

River and slough stage will be measured by DW and daily means computed. The daily mean of slough and river stage will be shown on a graph of water surface elevation versus time, similar in format to the daily mean groundwater elevation plots for groundwater monitoring wells.

E. Limiting Conditions Using Groups of Groundwater Monitoring

1. General

If the groundwater in a group of three or more contiguous seepage monitoring wells located on neighboring islands surrounding a reservoir island rises more than 0.25 foot above their upper bound envelopes of baseline data and if the timing of the increase correlates with the filling of the reservoir or storage of water in the reservoir (adjusted for changes in the daily means for the background groundwater monitoring wells), the reservoir filling will be stopped. This limiting condition is referred to as the Diversion Suspension Limit. Reservoir filling will not resume until the increased hydrostatic head condition is corrected or otherwise satisfactorily remediated. The details of this evaluation are described below.

2. Correlation with Local Activities

If an individual background monitoring well exceeds its upper base data reference envelope, then the land use practices in the general vicinity of each groundwater monitoring well will be checked to see if the irrigation and/or drainage practices have recently changed. Some groundwater variations may result from changes in land management practices, including irrigation patterns, shallow flooding for leaching the soil and suspension of ditch maintenance for land in a set-aside program. Activities in the nearby river or slough will also be checked. Dredging of rivers or sloughs can have substantial impacts on groundwater levels. DW will contact and query reclamation districts on dredging activity or other substantial marine activity near their islands if a marked increase in groundwater levels is observed.

3. Regional Corrections

The background monitoring well data will track the regional variations occurring in the groundwater levels beyond the influence of the reservoir islands. This evaluation will be both qualitative and quantitative. There is considerable imprecision in attempting to correlate one or more seepage monitoring wells with another well, including the background monitoring wells. DW will use a quantitative correction to the extent that the average background condition is above 80% of the full height of the background reference envelope, shown in Figure C-7a. The additional percentage above the 80% level in the background monitoring wells will be multiplied by the plus or minus two standard deviation baseline envelope for each seepage monitoring well. The resulting product will be added to the upper envelope for each seepage monitoring well as shown in Figure C-7b.

4. Initial Evaluation

The daily mean will be computed by DW for each individual seepage monitoring well for the period of time under consideration (referred to as "current" data). The current data for each seepage monitoring well will be compared with the reference (baseline) envelope for the same groundwater monitoring well. (The reference envelope will have been prepared based on a pre-reservoir-filling period as described above in section III.A and adjusted for average changes in background groundwater levels described in the previous paragraph.)

For each seepage monitoring well in the group, the difference between the current groundwater level and the upper envelope will be computed (see Figure C-8). The differences will be averaged for three or more contiguous seepage monitoring wells. The Diversion Suspension Limit for a group of three or more wells will be defined as exceeding the average difference between the current data and upper reference envelopes by 0.25 feet or more, contingent on the conditions in the following sections.

5. Correlation with DW Activities

Finally, the variation over time for the average of the differences between the current data and the upper envelope for the group of wells under consideration will be compared by DW with the changes in reservoir stages (and interceptor pumping rates) over the same period. This comparison will be used to check whether there is a correlation between the reservoir pool elevation and the measured increased head at the groundwater monitoring wells. If the increased head in the groundwater monitoring well correlates with the fluctuations in reservoir pool elevation and the average increase is 0.25 feet above the envelope after adjustments, this will define the Diversion Suspension Limits. DW will be required to suspend diversions of water into the reservoir and to implement measures to lower the groundwater level at the neighboring island perimeters facing the reservoir island. DW will not be allowed to resume diversions until the indicated seepage is resolved.

F. Limiting Conditions Using Individual Groundwater Monitoring Wells

The following procedure will be used by DW to assess whether an individual groundwater monitoring well on a neighboring island is being impacted by water storage on a reservoir island.

1. The daily mean for an individual groundwater monitoring well will be plotted for a current year against time. The current data will be compared with the reference envelope for this groundwater monitoring well. (The reference envelope will have been prepared based on a pre-reservoir filling period as described in section III.A. and adjusted for average changes in background levels as described in section III.E.3.) If the current water level is less than or equal to one foot above the upper reference line, no action will be indicated based on the single groundwater monitoring well data. If the current groundwater level is greater than one foot above the upper reference line, a seepage impact may be indicated, and the evaluation will continue to the following steps.

2. The land use practices in the general vicinity of the individual groundwater monitoring well, including flooding fields and dredging in the river or slough, will be checked to see if practices have changed as discussed in the previous section.

3. The variation of the individual groundwater monitoring well's daily means will be compared with the changes in reservoir stages recorded over the same period of time and/or marked decreases in interceptor well pumping across from the groundwater monitoring well. If the increased head in the groundwater monitoring well correlates with the fluctuations in reservoir pool elevation (or with marked decreases in interceptor well pumping rates) and the head in the aquifer is more than one foot above the adjusted upper reference envelope, this will be a Diversion Suspension Limit, and DW will be required to suspend diversions of water into the reservoir island. DW will not be allowed to resume diversions into that reservoir island until the indicated seepage is resolved.

G. Future Modifications

The methods described herein are intended to provide a rational and responsive evaluation of changes in groundwater levels and seepage that may be attributed to water storage on Bacon Island and Webb Tract. These methods have been assessed using samples of data collected during the initial groundwater monitoring program previously conducted by DW. If, after implementation of this procedure deficiencies are discovered, EBMUD and/or DW will report such deficiencies to the Monitoring and Action Board for consideration as set forth in paragraph 7.c of Attachment B to the EBMUD and DW Protest Dismissal Agreement.

H. Data Availability

Delta Wetlands will make the following groundwater data publicly available on the internet or similarly accessible means as soon as readily available:

- Daily mean of groundwater level in each seepage and background monitoring well, reference envelope, and any Project adjustments based on background monitoring wells.
- Average normalized groundwater level for all background monitoring wells, presented as a percentage of their reference envelopes.
- Daily mean of pool elevations for both reservoirs.
- Daily mean of water level in slough/river.

Delta Wetlands will also maintain a historical database of the above information.

IV. ACTIONS BY DELTA WETLANDS

Delta Wetlands shall take actions to control seepage. These actions may include the following, and are intended to be taken before seepage reaches the Diversion Suspension Limits.

1. Increase pumping rates in interceptor wells.

2. Lower outfall head at relief wells.

3. Redevelop interceptor wells to improve specific capacity of the wells.

4. Redevelop relief wells to improve specific capacity.

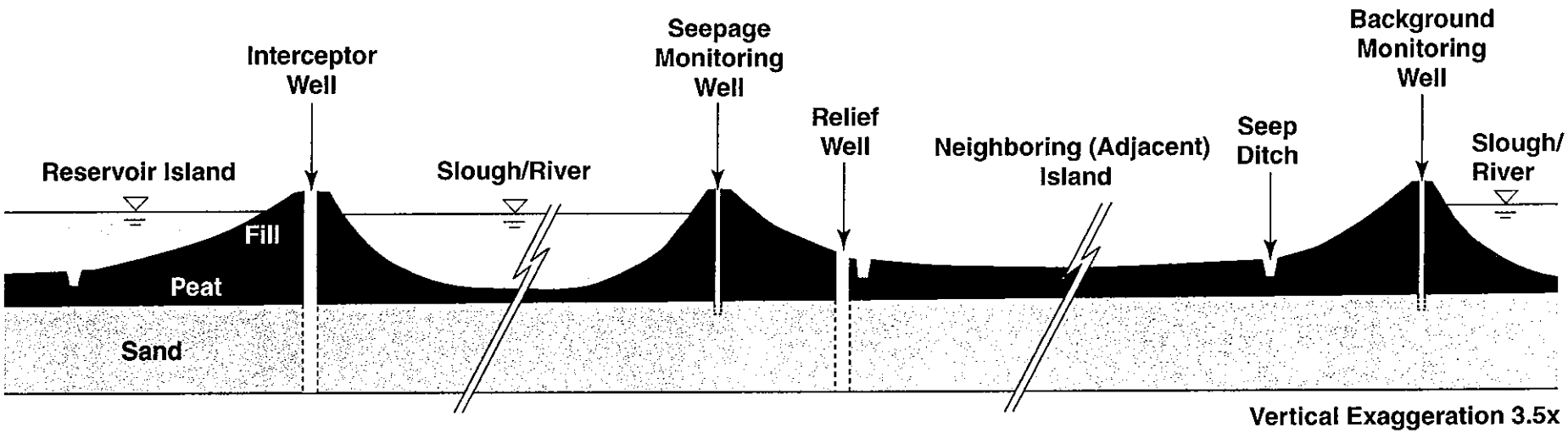
5. Install additional interceptor wells.

6. Install additional relief wells.

7. Implement other mitigation that may be mutually agreeable between Delta Wetlands, the affected adjacent landowners and the neighboring island reclamation district.

8. Stop diversion.

If the Diversion Suspension Limits are reached, DW shall immediately suspend additional water diversion into the reservoir island. Diversions may not renew until groundwater levels are brought below the Diversion Suspension Limits. If DW cannot lower the groundwater to below Diversion Suspension Limits within one week, the reservoir pool elevation shall be lowered at a rate of at least 0.5 feet per day until groundwater levels fall below Diversion Suspension Limits.



Groundwater Monitoring Wells

Seepage Monitoring Wells - Placed at the perimeter of an adjacent island, seepage monitoring wells will detect increased groundwater elevation if increased seepage occurs from slough or reservoir island.

Background Monitoring Wells - Placed far from reservoir islands, often on the far opposite perimeter of an adjacent island. Background monitoring wells will be used as a group to record Delta-wide variations in groundwater levels.

Groundwater Extraction Wells Note: All extraction wells, whether interceptor wells or relief wells, will have slotted screens extending through the full depth of the underlying aquifer.

Interceptor Wells - Pumped wells placed on the perimeter of a resevoir island. The pumping rate will be controlled to essentially capture all water tending to seep from beneath the reservoir perimeter.

Relief Wells - Placed at toe of adjacent island levee. Elevations of the tops of wells will be set such that the wells flow as artesian wells as groundwater surface rises. Where groundwater is not artesian, low head pumps may be used.

Figure C-1
Idealized Cross Section of Well Locations

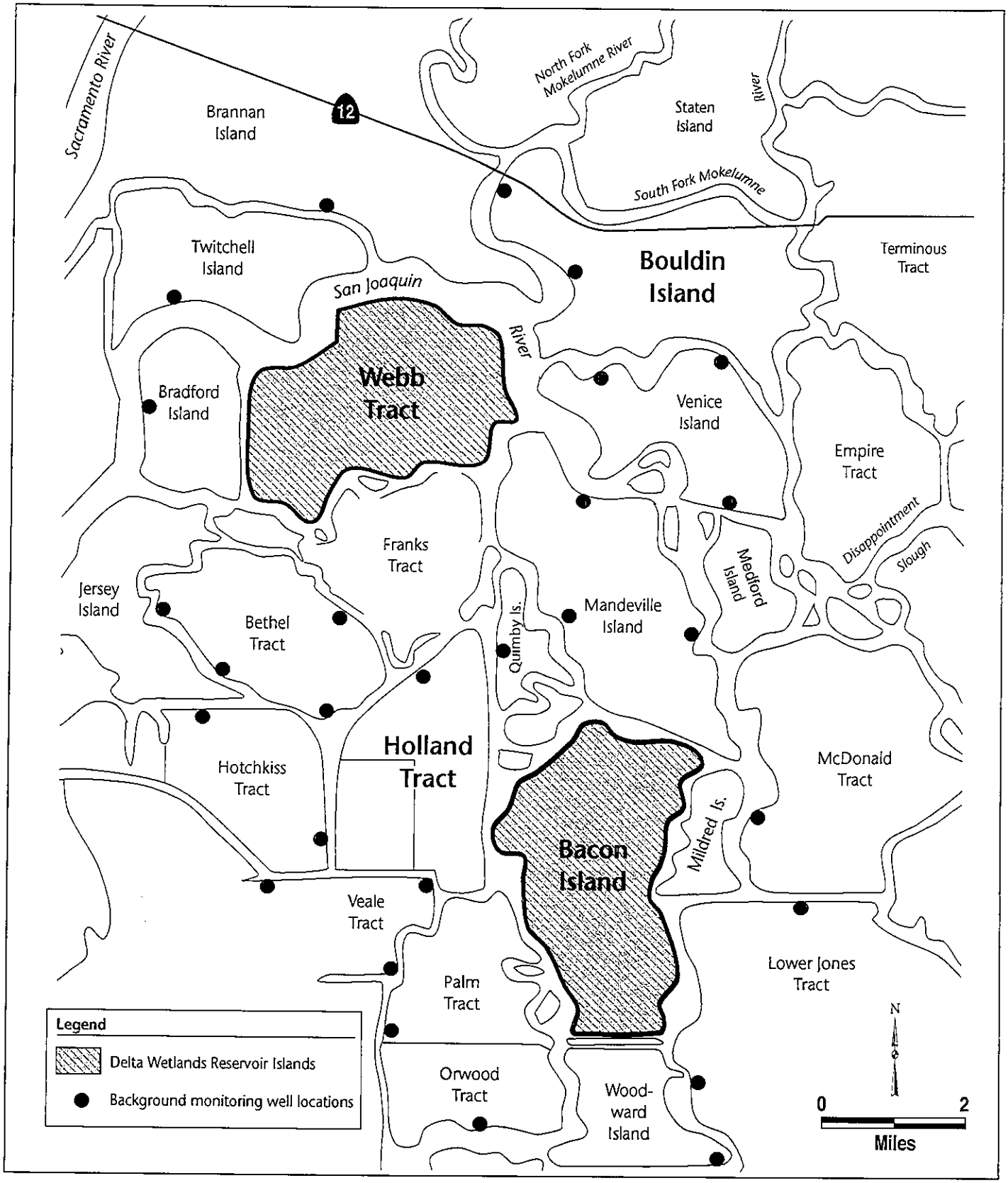


Figure C-2
Approximate Locations of Background Monitoring Wells

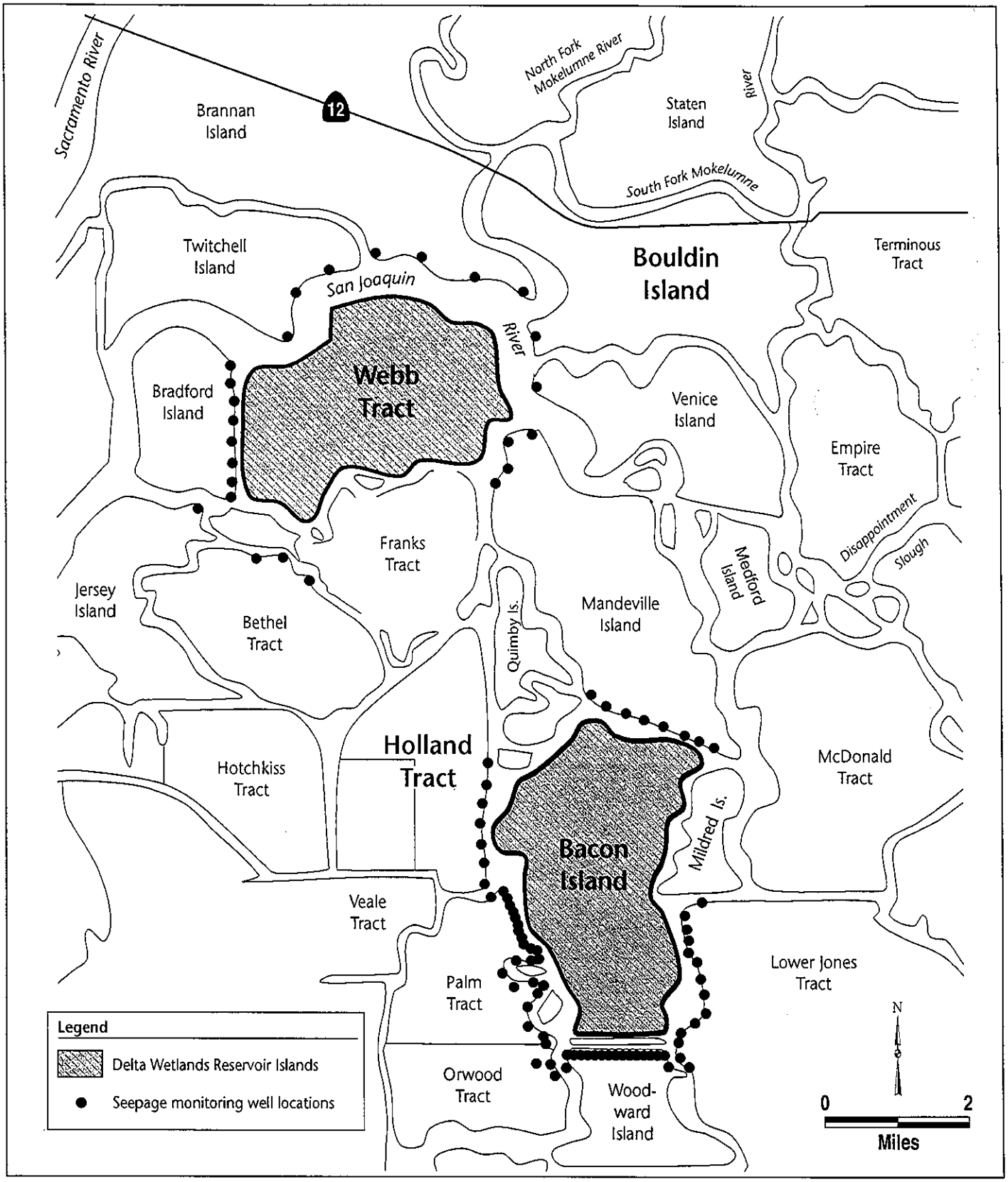


Figure C-3
Seepage Monitoring Well Locations

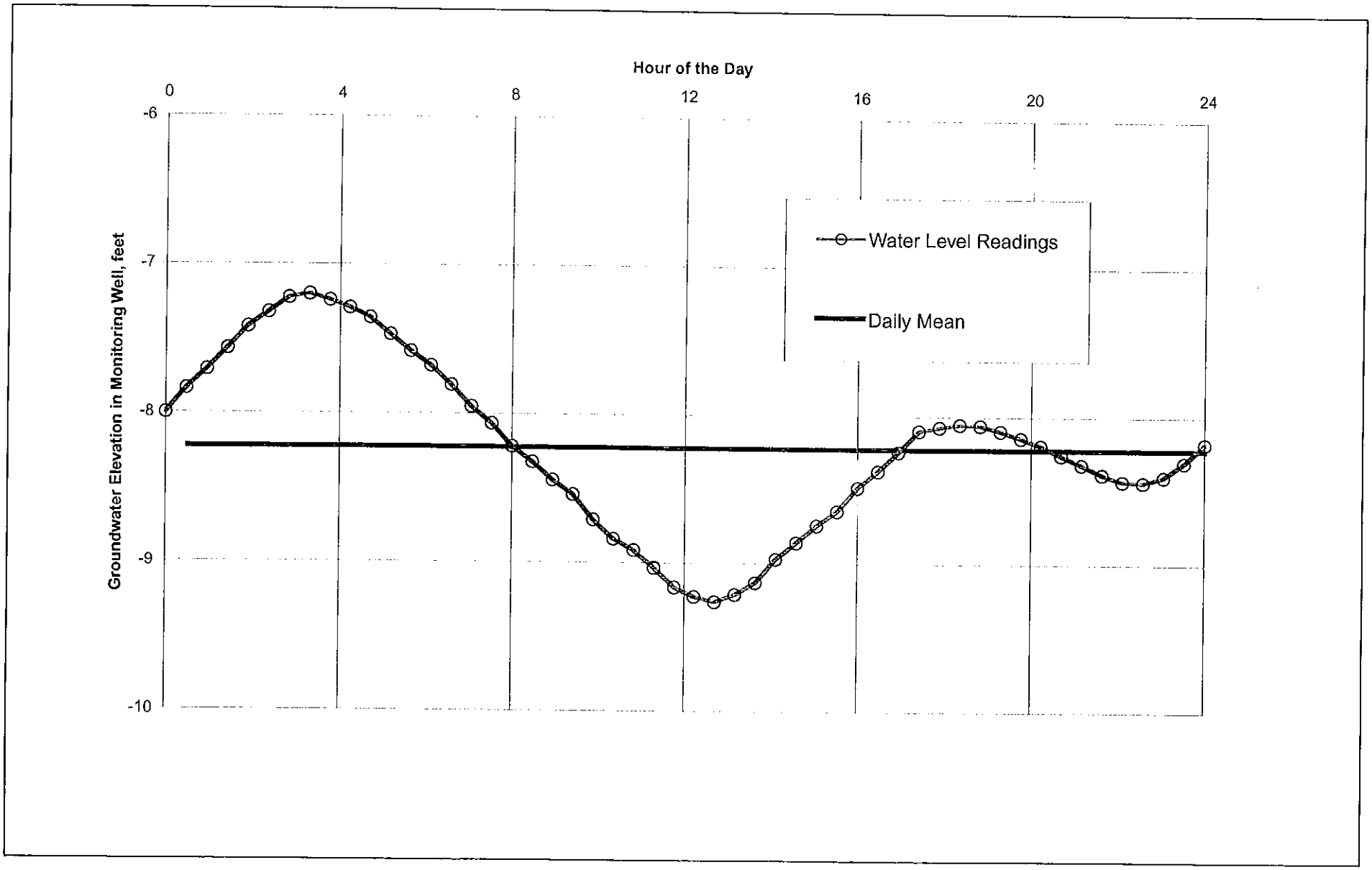
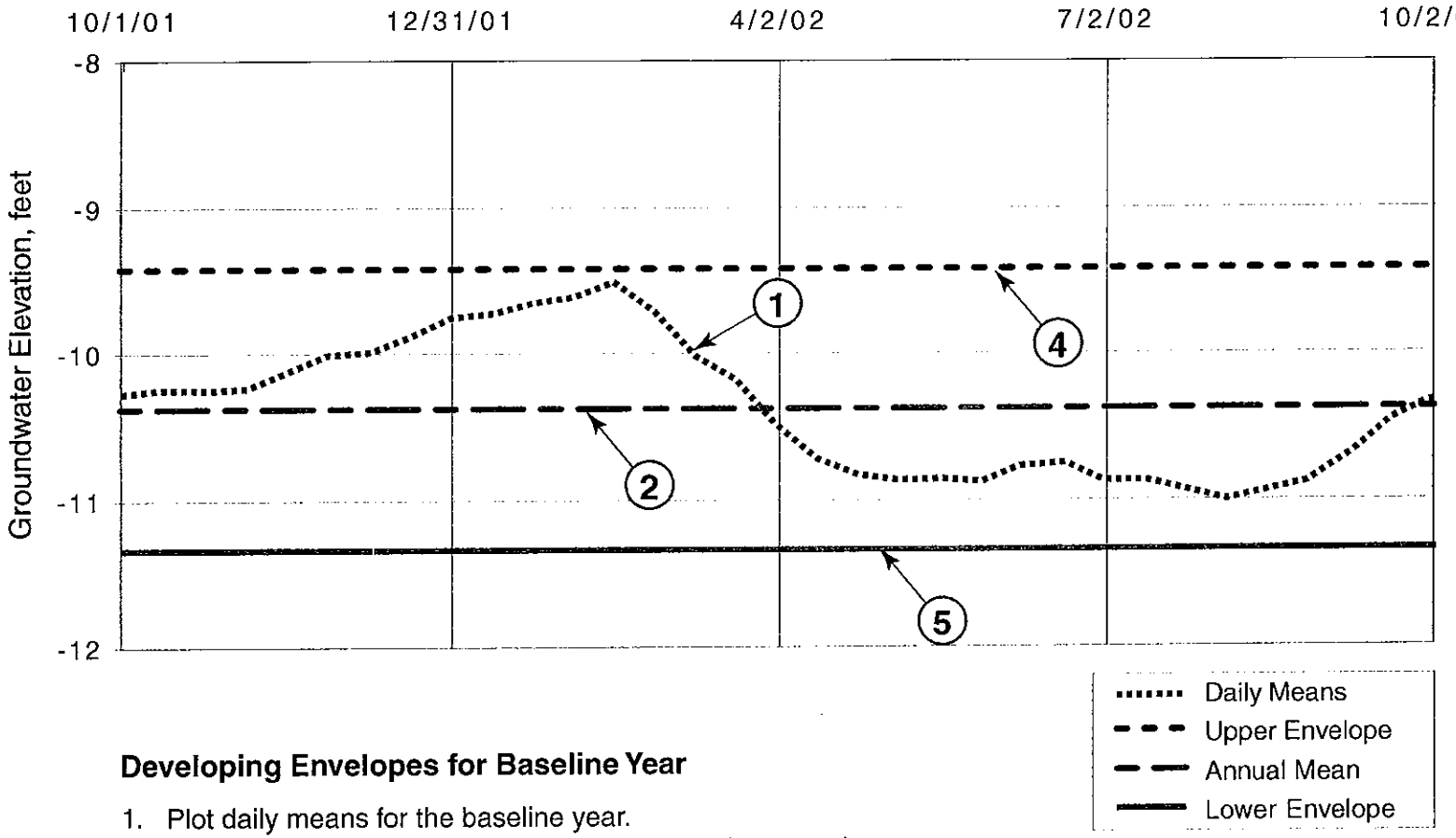


Figure C-4
Daily Mean



Developing Envelopes for Baseline Year

1. Plot daily means for the baseline year.
2. Compute average of daily means and plot as the annual mean.
3. Compute standard deviations of daily means around annual mean.
4. Compute and plot upper envelope as annual mean plus two standard deviations.
5. Compute and plot lower envelope as annual mean minus two standard deviations.

Figure C-5
Reference Envelope for Baseline Year

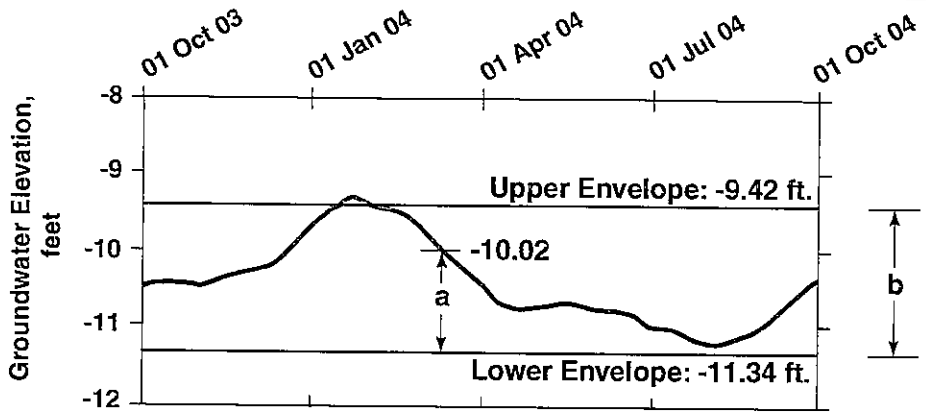


Figure C-6a. Background Monitoring Well Data for a Single Well

To normalize background monitoring well data to its unique envelope, subtract the lower envelope elevation from the daily mean and divide the remainder by the height of the envelope:

a/b = [(-10.02) - (-11.34)] / [(-9.42) - (-11.34)] = 65%

Figure C-6b. Computation for Normalizing Background Monitoring Well Data

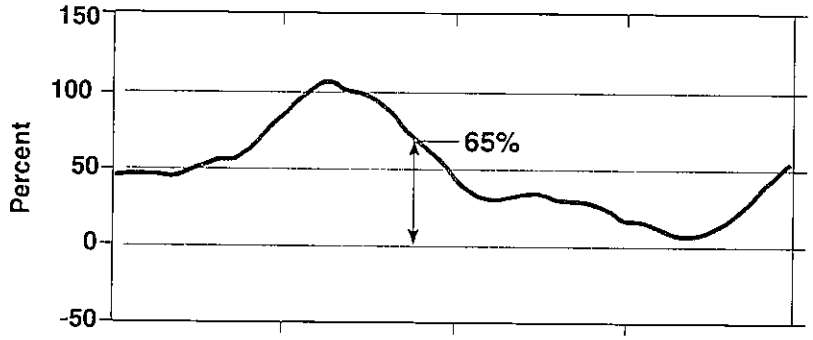


Figure C-6c. Plot of Normalized Background Monitoring Well Data for a Single Well

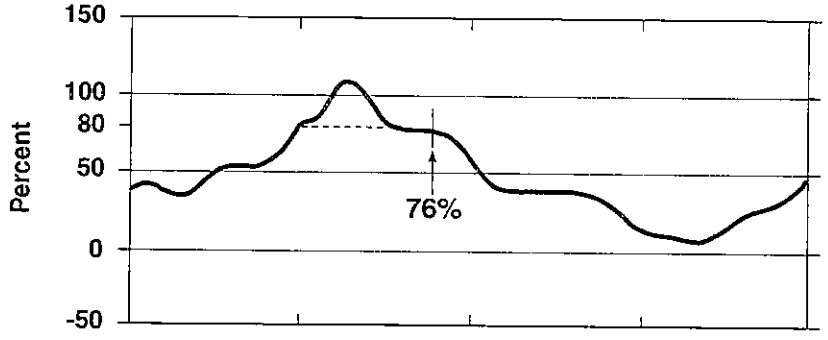


Figure C-6d. Average of Normalized Data for All Background Monitoring Wells

Figure C-6
Normalizing and Averaging Background Well Data

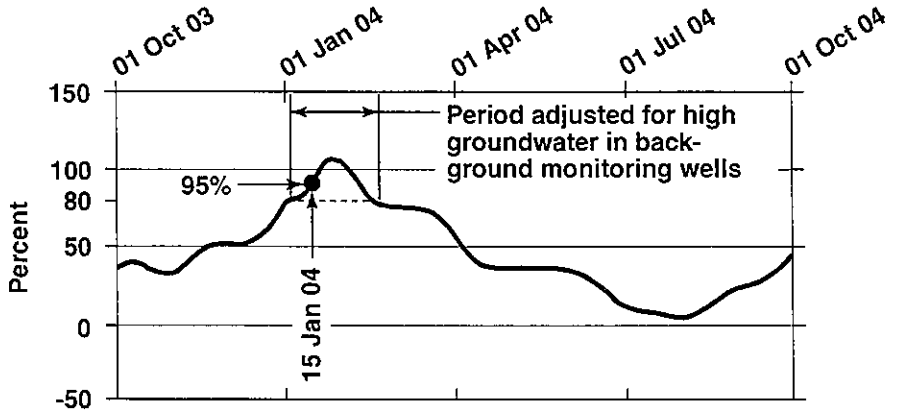


Figure C-7a. Average Normalized Data for All Background Monitoring Wells

On January 15, 2004, the average normalized data from the background monitoring well is 95%. At Seepage Monitoring Well A, the groundwater is at elevation -13.59 feet. To adjust Seepage Monitoring Well A's upper envelope for high groundwater conditions in the background monitoring wells:

1) Subtract 80% from the average for the background conditions:
95% - 80% = 15%

2) Multiply the height of Seepage Monitoring Well A's envelope by the above percentage remainder:
[(-13.84) - (-14.96)] x 15% = 0.17 ft.

3) Add the above product to the upper envelope:
-13.84 + 0.17 = 13.67 ft.

4) The above value is the adjusted upperbound envelope for this particular well on the particular day.

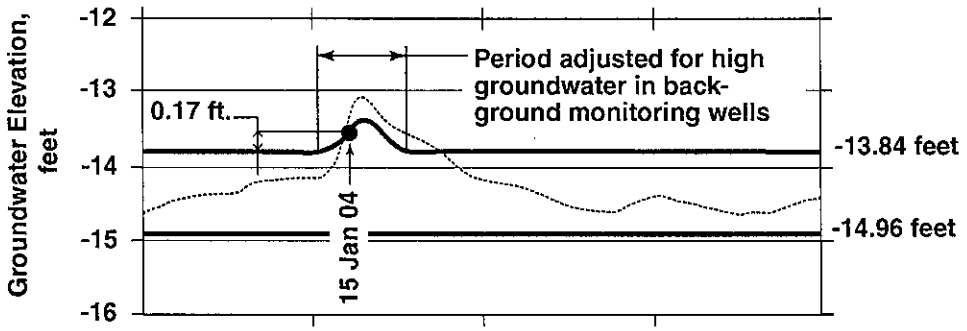
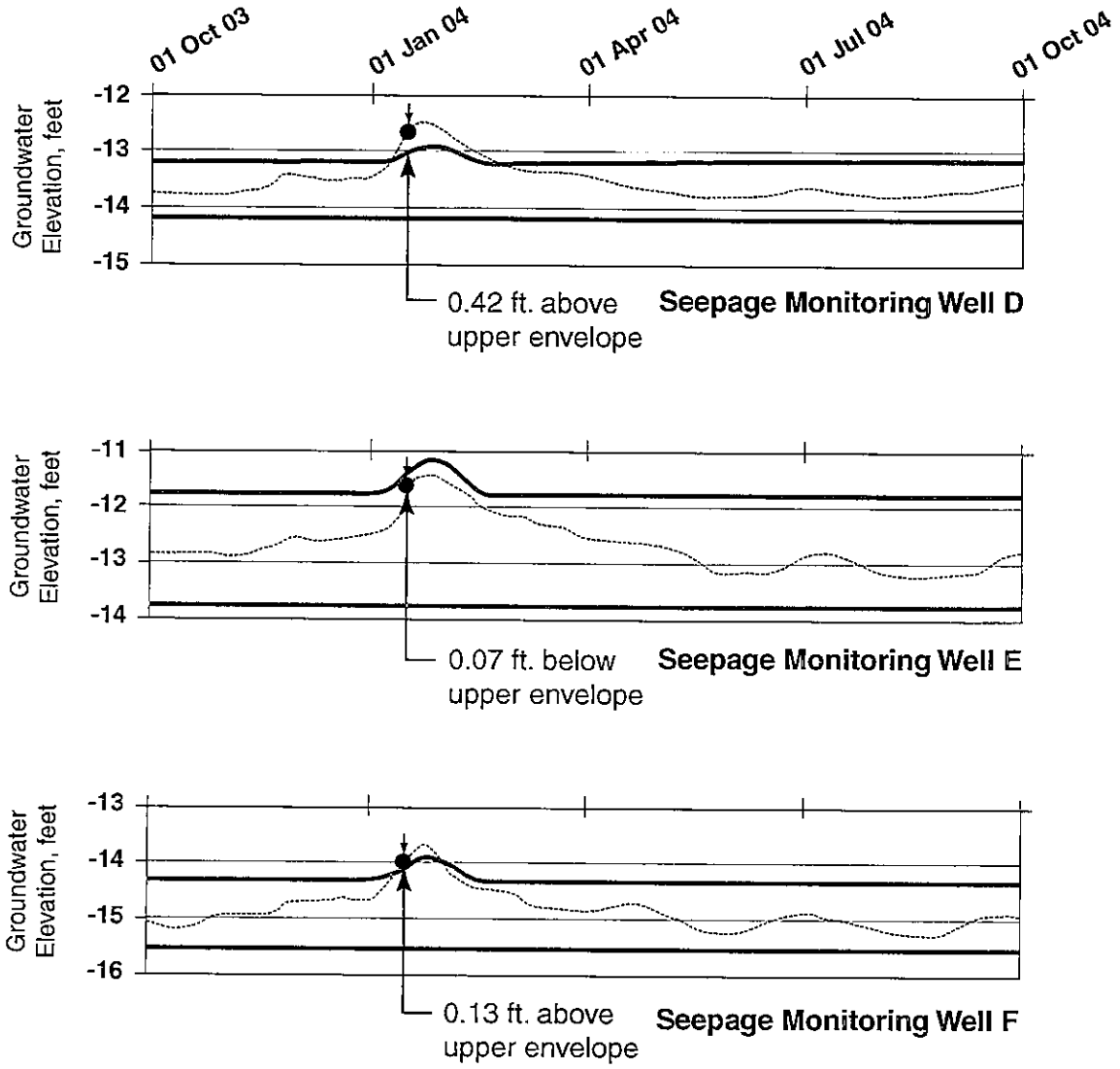


Figure C-7b. Upper Envelope of Seepage Monitoring Well A Corrected for High Groundwater in Background Monitoring Wells

Figure C-7
Correcting Upper Envelope for High Groundwater



Well No.	Groundwater Height Above Upper Envelope
D	0.42
E	-0.07
F	0.13
	0.48 ft ÷ 3 wells = 0.16 ft.

On January 15, 2004, the average groundwater height above upper envelopes for 3 wells is 0.16 ft. If the average is less than 0.25 feet above the upper envelope, the average groundwater level for these three wells is below the diversion suspension limit.

Figure C-8
Groundwater Evaluation Using Three Seepage Monitoring Wells

Agreement to Resolve Certain Delta Wetlands Permit Issues Between Delta Wetlands and California Urban Water Agencies

Exhibit D

AGREEMENT TO RESOLVE CERTAIN DELTA WETLANDS PERMIT ISSUES

This Agreement is entered into and effective this 9th day of October, 2000, by and between applicant **Delta Wetlands Properties** ("DWP") and the **California Urban Water Agencies** ("CUWA").

RECITALS

1. DWP proposes to develop a water storage project, known as the Delta Wetlands Project (hereinafter referred to as the "Project"), in the Sacramento-San Joaquin River Delta ("Delta"). The Project would divert and store water on two Delta islands (Bacon Island and Webb Tract, or "reservoir islands") and seasonally divert water to create and enhance wetlands and to manage wildlife habitat on two other islands (Bouldin Island and Holland Tract, or "habitat islands").

2. The intended purpose of the Project is to divert surplus Delta inflows, transferred water or banked water for later sale and/or release for Delta export or to meet water quality or flow requirements for the Delta.

3. DWP filed Water Right Applications 29061, 29062, 29063, and 29066 dated July 1, 1987 and Water Right Applications 30267, 30268, 30269, and 30270 dated July 21, 1993 ("Applications"), with the California State Water Resources Control Board ("SWRCB") for the Project.

4. In the pursuit of the necessary Water Right Permits for the Project, draft Environmental Impact Reports and Environmental Impact Statements ("Draft EIR/EIS Documents"), dated December 1990 and September 1995 have been prepared and circulated for public review. A Revised Draft EIR/EIS was released in May 2000. The lead agencies for said Draft EIR/EIS Documents are the SWRCB and the United States Army Corps of Engineers ("ACOE").

5. CUWA is an organization of member urban water agencies interested in protecting and improving the quality of water diverted from the Delta to their respective service areas. Two CUWA members, East Bay Municipal Utility District ("EBMUD") and Contra Costa Water District ("CCWD"), filed timely protests to the DWP water rights applications.

6. The SWRCB held a water rights hearing in mid-1997 ("SWRCB hearing") during which specific concerns were raised by CUWA and others regarding water quality and other issues.

7. CUWA is an interested party and presented testimony and evidence in the SWRCB hearing that the Project would injure CUWA member agencies unless certain mitigation measures were incorporated into the Project and its water rights permits to prevent or mitigate for such injuries.

8. Since the 1997 SWRCB hearing, other developments involving the Project and which are significant to CUWA have occurred, including release by the CALFED Bay-Delta Program ("CALFED") of its June 9, 2000, Framework for Action and August 28, 2000, Record of Decision for implementation of the CALFED Program which included a schedule for implementation of projects. In the context of this and other recent developments, CUWA, in conjunction with certain of its member agencies, has been working with DWP to address the issues raised by CUWA and others during the SWRCB hearing.

9. DWP, CUWA, and certain CUWA member agencies have participated in extensive efforts to develop a Water Quality Management Plan ("WQMP") for the Project to address the particular water quality issues regarding the Project that raise urban water quality concerns. The elements of the WQMP are intended to provide the urban water utilities with the necessary assurances that the Project will be operated in a manner that will ensure the protection of public health and long-term integrity of drinking water supplies diverted from the Delta, and that the Project, in conjunction with other components of the CALFED Bay-Delta Program, will result in net continuous improvement in Delta water quality.

10. DWP has executed Protest Dismissal Agreements with the two CUWA member agencies who filed protests, EBMUD and CCWD. Those Protest Dismissal Agreements provide certain assurances to EBMUD and CCWD which reflect the uniquely close geographic and hydraulic proximity of the Project reservoir islands to the CCWD intakes in the Delta and to EBMUD's Mokelumne River Aqueduct and to the migration corridor for the Mokelumne River anadromous fishery. The WQMP is incorporated by reference in the CCWD Protest Dismissal Agreement.

11. DWP is considering selling its interest in the Project to willing buyers, and certain agencies affiliated with the CALFED Bay-Delta Program are among the potential buyers which have expressed interest in possible acquisition of the Project. The State of California, through its Department of Water Resources ("DWR"), and the United States Bureau of Reclamation ("USBR") are potential purchasers of all or a part of the Project. Notwithstanding the foregoing, CUWA member agencies have not expressed an interest in acquisition of the Project, individually or through DWR or USBR, and have not determined that any benefits from the Project would accrue to them.

12. It is CUWA's position that State Water Project ("SWP") contractors should have an opportunity fully to comment on and contribute to decisions of DWR regarding allocation of the cost of DWR purchasing all or a part of Delta Wetlands' Project. Similarly, Federal Central Valley Project ("CVP") contractors should have an opportunity fully to comment on and contribute to decisions of USBR regarding allocation of the cost of USBR purchasing all or a part of the Project.

13. CUWA is also concerned that operation of any single unit or project, such as the Delta Wetlands Project, cannot meet all of CALFED's objectives, and completion and coordinated operation of several projects are essential to fully meet CALFED's goals of net continuous

water quality improvement, water supply reliability, ecosystem restoration and levee system stability.

14. CUWA is concerned that its member agencies could be adversely impacted if the Delta Wetlands Project were implemented in a way that was inconsistent with or adversely affected the schedules, as set forth in the CALFED August 28, 2000 Record of Decision, for CALFED water quality actions.

15. CUWA and DWP wish to resolve their differences with respect to the Project in a way that will protect CUWA's interests in water supply, water quality and environmental protection of the Delta insofar as said interests could be affected by the Project, and that would allow CUWA to withdraw its opposition to issuance of permits for the Project and not further dispute the adequacy of any EIR/EIS Documents for the Project.

16. The purpose of this Agreement is to set forth the terms and conditions upon which CUWA will withdraw its opposition to SWRCB issuance of permits for the Project, and not further dispute the adequacy of the environmental documents for the Project.

AGREEMENT

DWP and CUWA agree to the following terms and conditions:

A. DWP will implement and continue to operate according to the Delta Wetlands Water Quality Management Plan ("WQMP") attached hereto as Exhibit A and incorporated herein by this reference, which addresses the potential impacts of the Project on CUWA members' drinking water quality.

B. DWP and CUWA agree that Project operations will be coordinated with the operations of the CVP, SWP, and CALFED (and its successors). The intent of the coordination is:

1. Maintenance of water quality through the WQMP;

2. Achieving the CALFED goal of a net improvement in water quality through Project operations and coordinated implementation of CALFED Bay-Delta Program water quality components and actions;

3. Meeting water supply, water quality and environmental water requirements;

4. Protection of the fisheries resources in accordance with the SWP and CVP OCAP, and DWP aquatic species biological opinions, as they may be amended in the future;

5. Habitat development; and

6. Facilitating the use of the Project for a wide variety of project purposes.

C. During the period that the CALFED Bay-Delta Program as defined in the CALFED August 28, 2000 Record of Decision ("CALFED Program"), or its successor(s), is in effect, DWP will not seek State or Federal authorization, appropriation or any other form of funding for the purchase, lease, or any other form of total or partial acquisition of the Project, or for any studies regarding the Project, that will adversely affect or be in conflict with the CALFED Program or its schedule as defined in said Record of Decision. The purpose of this paragraph is to ensure that DWP, its successors and assigns, and the Project, do not adversely affect the funding, as determined by CALFED, for other elements of the CALFED Program.

D. DWP agrees that during the period that the CALFED Program, or successor Programs, is in effect, DWP shall not take any action which will adversely affect the schedule for implementation of the CALFED Program or any of its elements, and that, through the implementation of the WQMP, Project operations will not cause unmitigated adverse water quality impacts to drinking water users whose supply is diverted from the Delta. The purpose of this paragraph is to ensure that DWP, its successors and assigns, and the Project, do not adversely affect the schedule for other elements of the CALFED Program, or adversely affect the CALFED Program's goal of continuous improvement in water quality.

E. DWP and its agents shall, in all actions related to sales or other disposition of all or any part of the Project, use its best efforts to protect the interests of CUWA member agencies. To that end, in initiating negotiations for the sale of the Project to either DWR, USBR, or both, DWP shall use its best efforts to encourage those agencies to provide a process to allow SWP and/or CVP contractors to fully meet and confer directly with the DWR and/or USBR on cost allocation issues related to purchase of all or a part of the Project. Notwithstanding the foregoing, CUWA member agencies have not expressed an interest in acquisition of the Project, individually or through DWR or USBR, and have not determined that any benefits from the Project would accrue to them.

F. In the event that either DWR or USBR decline to meet and confer directly with SWP and/or CVP contractors on cost allocation issues, DWP agrees to provide an intensive alternative forum and process to facilitate full and complete analysis of allocation of any reimbursable and allocable costs related to the purchase by DWR and/or USBR of all or a part of the Project. DWP will pay all costs, up to a maximum of $200,000, of conducting a professionally facilitated review and assessment of all relevant cost allocation issues, and of preparing a detailed report on those issues.

G. CUWA shall withdraw its opposition to the issuance of water rights permits for the Project based on the terms and conditions of this Agreement and on the condition that the SWRCB expressly includes, in any water rights permits issued for the Project, the terms and conditions set forth in paragraphs A and B of this Agreement, or terms and conditions that CUWA and Delta Wetlands agree substantially conform to the terms and conditions of paragraphs A and B of this Agreement.

H. Whether or not the SWRCB includes the terms and conditions contained in this Agreement, Delta Wetlands and its successors shall be subject to and comply with the terms, conditions and requirements of this Agreement, including Exhibit A.

I. CUWA shall not further dispute the adequacy of the any EIR/EIS Documents for the Project in consideration of the protections provided by the WQMP.

J. DWP shall, as part of its direct case in the SWRCB hearings on DWP's applications for the Project, submit this Agreement as evidence and recommend to the SWRCB that it include this Agreement as a term of and condition to any water rights permit issued for the Project.

K. This Agreement shall be binding upon and inure to the benefit of the successors in interest and legal representatives of the respective parties. Whenever DWP is referred to in this Agreement, it applies to Delta Wetlands Properties as owner/operator of the Project, and to its successors and assigns, including but not limited to the State of California or its agencies, to the Federal government or its agencies, and to any other entity that might acquire all of or a partial interest in, or lease, or otherwise contractually agree to operate the Project.

L. All changes or modifications to this Agreement shall be in writing and signed by CUWA and DWP.

M. The signatories hereto represent that they are authorized to enter into this Agreement on behalf of the party for whom they sign. This document may be executed in duplicate originals.

DELTA WETLANDS PROPERTIES, an Illinois general partnership

By: KLMLP, L.P., a Delaware limited partnership, Special Partner

By: ZKS Real Estate Partners, LLC, a Delaware limited liability company, its authorized agent.

Dated: 10-9-00

By _____
Frederick L. Stephens, President

CALIFORNIA URBAN WATER AGENCIES

Dated: 10/9/00

By _____
Walter Bishop, Chairman of the Board

EXHIBIT A

WATER QUALITY MANAGEMENT PLAN

October 9, 2000

Preamble

Delta Wetlands Properties ("DW") proposed a water storage project on four islands in the Sacramento-San Joaquin Delta ("Delta"). The project would involve diverting and storing water on two of the islands (Bacon Island and Webb Tract, or "reservoir islands") and seasonally diverting water to create and enhance wetlands and to manage wildlife habitat on the other two islands (Bouldin Island and Holland Tract, or "habitat islands").

The purpose of the Delta Wetlands Project ("Project") is to divert surplus Delta inflows, transferred water or banked water for later sale and/or release for Delta export or to meet water quality or flow requirements for the Delta. To operate the Project, DW would strengthen the levees and install additional siphons and water pumps on the perimeters of the reservoir islands. The Project is undergoing environmental review (CEQA and NEPA), water rights permitting (State Water Resources Control Board), and an appraisal level study of the Project by the U.S. Bureau of Reclamation ("USBR").

California Urban Water Agencies[1] ("CUWA") and its member agencies have been participating in the public review of the Project since 1997 and are parties to the water rights proceedings for the Project. The primary focus of CUWA's participation in the review of the Project has been to seek a commitment from the Project proponents to minimize and mitigate drinking water quality impacts due to Project operations. Because of the close proximity of the reservoir islands to the Banks Pumping Plant, Tracy Pumping Plant, Contra Costa Canal at Pumping Plant #1, Contra Costa Water District's ("CCWD") Los Vaqueros intake on Old River and CCWD's Mallard Slough intake (hereafter "urban intakes"), CUWA is concerned that there is a potential for DW operations to result in increased total organic carbon ("TOC"), bromide, total dissolved solids ("TDS"), and chloride concentrations in urban water supplies.

In an effort to address CUWA's water quality concerns, Delta Wetlands Properties proposes to implement a water quality management plan ("WQMP"). The WQMP includes drinking water quality protection principles, an annual operating plan, general operating principles, a comprehensive monitoring program, screening procedures and operational constraints, and mitigation of water quality impacts. Collectively, the elements of the WQMP are intended to provide the urban water utilities with the necessary assurances that the Project will be operated in a manner that will ensure the protection of public health and long-term integrity of drinking water supplies diverted from the Sacramento-San Joaquin Delta.

The WQMP was developed through a negotiated process to resolve issues that are specific to the Project. The terms and conditions of the WQMP are intended to address the potential for injury to senior water rights holders associated with water quality degradation caused by the Project.

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[1] All references to CUWA shall mean CUWA, its current member agencies and those member agencies of record as of the date of this agreement.

The impacts caused by the Project are unique because of its proximity to urban water agencies' intakes and the high rates of discharge from the reservoir islands. The Project, without the protections provided by the WQMP, has the potential to adversely impact human health by increasing disinfection by-products ("DBP") and to increase the overall cost of water utility operations. The Project could also lead to long-term degradation in drinking water quality. Because the WQMP includes distinctive features that are specific to DW, it should not be construed as setting a precedent that would be applicable to other dissimilar projects subject to State Water Resources Control Board jurisdiction.

A. Drinking Water Quality Protection Principles

The Project will adhere to the drinking water quality protection principles described below through the implementation of the terms and conditions of this WQMP.

1. Project operations shall cause no adverse health impacts to water users;

2. Project operations shall not cause nor contribute to non-compliance with current or future drinking water regulations;

3. Project operations shall cause no increases in the cost of water treatment or operations;

4. Project operations shall contribute to CALFED's progress toward achieving continuous improvement of Delta drinking water source quality; and

5. Project operations shall minimize and mitigate for any degradation in the quality of drinking water supplies.

B. Water Quality Management and Action Board and Annual Operating Plan

The Water Quality Management and Action Board and the Annual Operating Plan outlined below are intended to support the administration and implementation of the WQMP.

1. Prior to initiating or continuing Project operations, a Water Quality Management and Action Board ("WQMAB") shall be appointed to oversee the implementation of the WQMP for the Project subject to the procedures, duties and requirements set forth in Attachment 1.

2. Prior to February 15 of each year, DW will propose an Annual Operating Plan for approval by the WQMAB. The Annual Operating Plan will be updated monthly and coordinated with Central Valley Project, State Water Project, and CCWD operations. The Annual Operating Plan will include:

   a. Schedules and estimated quantities for diversions to the Project islands and discharges from the Project islands.

   b. Water quality goals and objectives, including the estimated concentration of TOC, bromide, chloride, and TDS for the diversions to the Project islands and discharges from the Project islands.

c. An estimate of the projected change in the concentration of TOC, bromide, chloride, and TDS at the urban diversion locations due to scheduled Project operations.

d. Maximum allowable concentrations of the water quality constituents of concern (TOC, bromide, TDS, and chloride) for water stored on the reservoir islands, above which it will be necessary for DW to pursue remedial actions pursuant to the Emergency Operating Plan. The maximum allowable concentrations are upper limits above which discharge of water from the reservoir islands may cause a violation of one or more of the drinking water quality protection principles.

e. An Emergency Operating Plan describing remedial actions to be taken by DW in the event the water stored on the reservoir islands exceed the maximum allowable concentrations for the constituents of concern, including a procedure for discharge of the water from the reservoir islands that will minimize the potential for impacts to urban water utilities.

f. A schedule for habitat island operations, including diversion and discharge rates.

g. A schedule for reservoir island operations for non-storage periods.

h. A description of the monitoring program, hydrodynamic models, and particle-tracking models pursuant to Section D.

i. A description of mitigation measures to be implemented by DW to offset any long-term net increase in TOC, TDS, bromide or chloride loading pursuant to Section F.

C. General Operating Principles

The general operating principles outlined below are intended to support implementation of the WQMP.

1. To maintain low TOC, bromide and salinity levels to the fullest extent practicable, DW will:

   a. Avoid practices that will result in high TOC productivity during non-storage periods;

   b. Avoid diversions to storage during peak TOC periods;

   c. Avoid diversions to storage during high bromide and high salinity periods; and

   d. Manage vegetative growth on the reservoir islands to minimize TOC production.

2. To avoid degradation in water quality at the urban intakes in the Delta, DW will develop operational procedures to:

   a. Reduce the rate of discharge from the reservoir islands as appropriate;

b. Coordinate discharges between reservoir islands; and

c. Adjust discharges for exports in accordance with Delta hydrodynamic (e.g., tides, pulse flows).

3. To avoid excessive TOC, bromide and salinity levels, DW will:

a. Pursue remedial actions or acquire offsets before initiating further diversions to storage if TOC, bromide or salinity concentrations on reservoir islands regularly exceed 80% of the maximum allowable concentrations set forth in the Annual Operating Plan.

D. Comprehensive Monitoring Program

The comprehensive monitoring program outlined below will be developed and in place prior to initiating Project operations. The monitoring program provides for the collection of data to support the screening of Project operations and for imposition of operational constraints pursuant to Section E and the identification of mitigation requirements pursuant to Section F.

1. DW will conduct real-time water quality monitoring on the reservoir and habitat islands and in the Delta channels at the discharge locations of the reservoirs and habitat islands prior to and during all discharge periods.

2. The State Department of Water Resources ("DWR"), USBR and CCWD will provide real-time water quality monitoring data at urban intakes in the Delta.

3. The owners of urban water treatment facilities will provide water quality monitoring and operational data at water treatment plants.

4. The water quality monitoring program shall include quality assurance and quality control provisions.

5. Monitoring parameters will include TOC, bromide, TDS, chloride, UVA, DO, turbidity, and temperature.

6. DW will post monthly summaries of the data collected pursuant to subsections 1 through 3 above on the DW web site or adopt an alternative means of disseminating this information to the WQMAB and interested parties that provides an equivalent degree of accessibility.

7. Hydrodynamic and particle-tracking models will be used to predict both baseline conditions (without Project) and real-time changes at the urban intakes in the Delta prior to, during and after a Project operation. DW will submit a proposed monitoring and modeling program for approval by the WQMAB prior to operating the reservoir islands with annual updates and approvals of the modeling program thereafter (through the Annual Operating Plan review process) to reflect advances in science and technology.

Water quality constituent predictions required by the WQMP shall be calculated in accordance with the initial models and modeling assumptions set forth in Attachment 3, unless otherwise approved by the WQMAB.

E. Screening Procedures and Operational Constraints to Prevent Short-Term Impacts

The process outlined below for screening of Project operations and imposition of operational constraints is intended to prevent short-term impacts to urban water utilities and to ensure adherence to the drinking water quality protection principles 1 through 3 set forth in Section A.

1. Operational screening criteria will be used to identify Project operations that may threaten adherence to one or more of the drinking water quality protection principles. The operational screening criteria are set forth in Attachment 2 and implemented as described below.

2. Prior to DW initiating each diversion to the reservoir islands and each discharge from the reservoir islands and weekly thereafter during continuing diversions and discharges, the hydrodynamic and particle-tracking models will be used to predict whether Project operations (including operations of the habitat islands) are likely to exceed one or more of the operational screening criteria at the urban intakes in the Delta. (See Attachment 2, criteria A1, A2, B1, B2, C1, and C2.)

3. If the model output indicates that Project operations may exceed one or more of the operational screening criteria at one or more of the urban intakes in the Delta, DW will conduct further studies (prior to initiating a diversion to the reservoir islands or a discharge from the reservoir islands) to determine whether one or more of the drinking water quality protection principles would be threatened at an urban water treatment plant. (See Attachment 2, criteria A3, B3, and B4.)

4. If, upon further study, it appears that Project operations may threaten one or more of the drinking water protection principles at an urban water treatment plant, a determination will be made whether the threat would be offset by a Project-induced water quality or water supply improvement. If the owner of the impacted water treatment plant agrees that the threat would be offset or agrees to waive its right to protection under the WQMP, DW may initiate the diversion to the reservoir islands or discharge from the reservoir islands.

5. If Project operations threaten a drinking water quality protection principle at the water treatment plant without offsetting benefits and the treatment plant owner has not waived its right to protection, Project operations will be reduced, rescheduled or otherwise constrained as necessary to prevent the impact from occurring.

6. If an urban water treatment plant owner presents a complaint to DW and the WQMAB that: (1) a violation of a drinking water quality protection principle has occurred or is likely to occur in the absence of remedial action, or (2) one of the Project screening criteria set forth in Attachment 2 has been exceeded or is likely to be exceeded in the absence of remedial action, and (3) the WQMAB finds that the complaint has sufficient

merit to warrant an investigation; the WQMAB shall proceed with an investigation of the complaint. Throughout the duration of the WQMAB's investigation of the complaint and until the matter is resolved by the WQMAB, Project operations shall be restricted such that the maximum discharge rate from a reservoir island shall not exceed the schedule set forth in Table 1. Alternatively, the Project operations may proceed pursuant to the terms of an Emergency Operating Plan that has been approved by the WQMAB. DW shall cooperate with the WQMAB throughout the duration of the investigation.

7. If the WQMAB pursuant to the investigations set forth in paragraph E.6 make a finding that monitoring, modeling, and/or operational constraints fail to prevent a violation of a drinking water quality protection principle resulting from Project operations, or fail to prevent an exceedance of one of the operational screening criteria set forth in Attachment 2 due to Project operations, the WQMAB shall require DW to initiate emergency operations or take remedial actions to correct the problems.

Table 1[1]

TOC Concentration on Bacon Island Minus That of Ambient Water (mg/L)[2]	Maximum Discharge Rate from Bacon Island (cfs)[2]	TOC Concentration on Webb Tract Minus That of Ambient Water (mg/L)	Maximum Discharge Rate from Webb Tract (cfs)[2]	Chloride Concentration on a Reservoir Island (mg/L)	Maximum Combined Discharge Rate from Bacon Island and Webb Tract (cfs)[2]
0 to 1.0	1,500	0 to 3.0	1,500	0 to 50	3,000
1.1 to 2.0	1,250	3.1 to 4.0	1,250	51 to 70	2,500
2.1 to 3.0	1,000	4.1 to 5.0	1,000	71 to 90	2,000
3.1 to 4.0	750	5.1 to 6.0	750	91 to 110	1,500
4.1 to 5.0	500	6.1 to 7.0	500	111 to 130	1,000
5.1 to 6.0	250	7.1 to 8.0	250	131 to 150	500
6.1 to 7.0	125	8.1 to 9.0	125	151 to 170	250
Greater than 7.0	40	Greater than 9.0	40	171 to 250	80

Table 1 footnotes:

[1] The restrictions on discharges from the reservoir islands contained in Table 1 for various concentrations of TOC and chloride are not applicable if the TOC and chloride concentrations on a reservoir island are less than or equal to the average TOC and chloride measured in the channels adjacent to the reservoir islands for the 7-day period prior to initiating the discharge.

[2] The maximum discharge rate means the average discharge rate over a 14-day period or the duration of the discharge, whichever time period is less. The maximum discharge rate shall be further constrained, as necessary, to limit the total contribution from the reservoir islands at the urban intakes to 25% of the combined export pumping at the Banks and Tracy pumping plants.

F. Mitigation of Long-Term Water Quality Impacts.

The process outlined below for mitigation of long-term water quality impacts due to Project operations is intended to prevent long-term impacts to urban water utilities and ensure adherence to the drinking water quality protection principles 3 and 4 set forth in Section A. Should Project operations produce a long-term net increase in TOC, TDS, bromide or chloride loading in the urban diversions, mitigation may be necessary, as described below:

1. During the course of the 12-month operating plan, DW shall maintain a running account of the changes in TOC, TDS, bromide and chloride in the water diverted from the Delta for urban use due to Project operations.

2. Once every three years, DW shall submit an accounting of the net increase or decrease in TOC, TDS, bromide and chloride loading in the water diverted from the Delta for urban use due to Project operations (including habitat island operations).

3. DW shall be required to acquire offsets or otherwise mitigate 150% of the net increase in TOC, TDS, bromide and chloride loading greater than 5% in the urban diversions due to Project operations.

4. DW must acquire the offsets or complete the mitigation at its expense within 24 months after the submission of the accounting set forth in 2 above. Any offset or mitigation that is provided in the current accounting period that is due to a mitigation requirement that accrued during a previous accounting period shall be excluded from the calculation of the net increase for the current accounting period.

5. In recognition of initial Project start-up, long-term mitigation requirements for TOC loading shall be waived for the first year of reservoir operation; however, the screening procedures and operational constraints to prevent short-term impacts set forth in Section E shall still apply.

ATTACHMENT 1
WATER QUALITY MANAGEMENT AND ACTION BOARD

1. **Purpose**: A Water Quality Management and Action Board ("WQMAB"), or an equivalent mutually acceptable authority, shall be appointed to oversee the implementation of the Water Quality Management Plan ("WQMP") for the Delta Wetlands Project ("Project").

2. **Members**:

   a. **Qualifications**: The three members and three alternates shall be registered professional engineers, public health professionals or scientists possessing a thorough understanding of Delta operations and recognized for their expertise in organic and inorganic water chemistry and drinking water treatment.

   b. **Appointment Process**: The State Water Resources Control Board ("SWRCB"), California Urban Water Agencies ("CUWA"), and Delta Wetlands Properties ("DW") shall each appoint one member and one alternate. Each prospective member of the WQMAB shall be required to disclose any past or current conflicts of interest that may affect their ability to serve as impartial members of the WQMAB. Appointment of prospective members with past or current conflicts of interest must be approved by the mutual consent of CUWA and DW. In the event that the SWRCB does not appoint its member or alternate to the WQMAB, CUWA and DW shall appoint the SWRCB's member or alternate member. Each of the WQMAB members shall be appointed for a term of four years. At the end of the 4-year term, the same selection process will be used to select the new WQMAB.

3. **Term**: The WQMAB shall be established prior to the first diversions to storage on Bacon Island or Webb Tract ("initial operations") and shall continue thereafter for the duration of Project reservoir operations.

4. **Compensation**: Members of the WQMAB are to be compensated by DW for their time on an hourly basis. Such costs, including costs of reports which may be prepared and studies which may be undertaken by the WQMAB, shall be part of the annual operation and maintenance costs of the Project.

5. **Duties**:

   a. The WQMAB shall serve as a neutral water quality advisory panel, hearing and investigating formally identified problems purportedly caused by Project reservoir operations, including but not limited to nonconformance with the Annual Operating Plan and violations of the Drinking Water Quality Protection Principles.

   b. Prior to initial operations and annually thereafter, DW shall submit a proposed Annual Operating Plan for approval by the WQMAB pursuant to Section B of the WQMP.

i. Prior to approving the Annual Operating Plan, the WQMAB shall provide an opportunity to comment on the draft Annual Operating Plan to the SWRCB, CUWA, and all other parties who have notified the WQMAB of their interest to comment on the draft Annual Operating Plan ("Interested Parties").

ii. In the event of any objection by CUWA or an Interested Party, the WQMAB may only approve the Annual Operating Plan after holding a noticed hearing on the proposed operating plan.

iii. If the WQMAB approves the Annual Operating Plan, the WQMAB shall immediately so advise DW.

iv. If the WQMAB does not approve an Annual Operating Plan, the WQMAB shall, within 10 days, provide a report explaining its decision to DW and to the Executive Director of the SWRCB. DW may provide a response to the WQMAB report to the Executive Director.

v. The issue of adequacy of the Annual Operating Plan will be decided by the Executive Director of the SWRCB as soon as possible upon receipt of such report.

vi. If the WQMAB does not approve the Annual Operating Plan for any reason, DW may continue its reservoir operations pursuant to the previously approved Annual Operating Plan or pursuant to paragraph E.6 of the WQMP, if applicable.

c. DW shall make available water quality monitoring and modeling data to the WQMAB pursuant to Sections D and E of the WQMP.

d. During the first two years following initial operations, the WQMAB shall review water quality monitoring data at each stage of filling and discharge of the reservoir islands.

e. At the end of the third year of operations and every three years thereafter, DW shall submit to the WQMAB an accounting of the net increase or decrease in water quality parameters of concern in the water diverted from the Delta for urban use due to Project operations pursuant to Section F of the WQMP. Prior to initiating the fourth year of operations and each year thereafter, the Annual Operating Plan shall include a plan to offset or otherwise mitigate any net increase in water quality parameters of concern pursuant to Section F of the WQMP.

f. If the WQMAB determines that the Project operations are not in conformance with the Annual Operating Plan, the WQMAB shall require the permittee to initiate emergency operations or take remedial actions to correct problems as provided for in paragraph E.7 of the WQMP.

g. The terms of the WQMP may be adjusted over time by the SWRCB as set forth below. The SWRCB reserves jurisdiction over changes in the WQMP to coordinate or modify its terms for the protection of other legal users of water and the public interest as future

conditions may warrant. The SWRCB delegates authority to the Executive Director of the SWRCB to take actions under this reservation of jurisdiction as set forth below.

i. During the third year of Project operations, the WQMAB shall review the WQMP to determine if changes in any of the WQMP terms are advisable. In its review, the WQMAB shall examine actual operation of the Project to date and any adverse effects of Project reservoir operations, including impacts to urban water agencies, degradation of drinking water quality, overall progress toward achieving continuous improvement of drinking water source quality, and any recent changes in state and federal drinking water regulations. The WQMAB will base each of its recommended changes to WQMP terms, if any, on its independent, professional judgment. At the conclusion of its review, the WQMAB shall issue a written list of its recommended changes, if any. The list shall be sent by the WQMAB to the SWRCB, DW, CUWA, and all other Interested Parties.

ii. If no party raises a reasonable objection to a change recommended by the WQMAB within 30 days of service of any proposed change, then the Executive Director of the SWRCB may approve the change without the need for a comment period or hearing. In the event of any objection, the SWRCB may only approve the change after it provides notice of and an opportunity to comment on the proposed change. If requested by an DW, CUWA, or any Interested Party, the SWRCB may hold a hearing on the proposed change.

h. After its initial 3-year review of the WQMP as set forth above, the WQMAB may thereafter periodically review and change the terms of the WQMP so long as the SWRCB review and approval process set forth above is followed.

ATTACHMENT 2
OPERATIONAL SCREENING CRITERIA

Operational Constraints

The operational screening criteria outlined in this attachment were developed to support the process outlined in Section E of the Water Quality Management Plan ("WQMP") for screening of Delta Wetlands Project ("Project") operations and imposition of operational constraints. This process is intended to support Delta Wetlands' ("DW") adherence to the drinking water quality protection principles 1 through 3 described in Section A of the WQMP.

These screening criteria are based on existing state and federal standards for disinfection by-products and their precursors. Should drinking water DBPs, contaminants or precursors, or any other drinking water contaminants be further regulated under state or federal law, the WQMAB shall recommend that the SWRCB amend the screening criteria to ensure that the intent of the drinking water quality protection principles continues to be met.

Evaluation of Project operations using these screening criteria will be based on real-time field measurements and computer modeling results, both of which are subject to uncertainties. For purposes of determining whether the Project has caused an exceedance of one or more of the operational screen criteria, an uncertainty of ±5% of the screening criteria will be assumed.[2] Should greater precision in measurements and calculations be developed, the improved level of confidence will be used as appropriate for each individual parameter.

An exceedance of the operational screening criteria set forth in Sections A, B and C below shall be calculated as a 14-day average, or the average for duration of the discharge, whichever time period is less.

A. TOC Loading

The criteria below will be used in the screening procedures set forth in paragraphs E2 and E3 of the WQMP and in the imposition of operational constraints in paragraph E5 of the WQMP. The criteria are intended to prevent an impact due to Project-related TOC loading that may cause an increase in water treatment costs.

1. Project operations that cause an increase in TOC of more than 1.0 mg/L at the urban intakes; or

2. Project operations that cause TOC concentrations at the urban intakes to exceed 4.0 mg/L; and

[2] An uncertainty of ±5% shall mean that an exceedance of an operational screen criteria does not occur until the Project causes the following values to be exceeded: condition A.1 not applicable; conditions A.2 and A.3 = 0.2 mg/L TOC; conditions B.1 and B.3 = 3.2 µg/L TTHM; conditions B2 and B4 = 0.4 µg/L bromate; conditions C1 and C2 not applicable.

3. Project operations that cause TOC concentrations at a water treatment plant to exceed 4.0 mg/L.

B. DBP Formation

The criteria below will be used in the screening procedures set forth in paragraphs E.2 and E.3 of the WQMP and in the imposition of operational constraints in paragraph E.5 of the WQMP. The criteria are intended to prevent an impact due to Project-related DBP precursor loading that may cause health impacts to water users or may cause or contribute to a water treatment plant violation of a health regulation:

1. Project operations that cause or contribute to modeled Total Trihalomethanes ("TTHM") concentrations in drinking water in excess of 64 µg/L, as calculated in the raw water of an urban intake in the Delta;
2. Project operations that cause or contribute to modeled bromate concentrations in drinking water in excess of 8 µg/L, as calculated in the raw water of an urban intake in the Delta;
3. Project operations that cause or contribute to predicted TTHM concentrations in drinking water in excess of 64 µg/L, as calculated from measurements at the outlet of a water treatment plant; or
4. Project operations that cause or contribute to predicted bromate concentrations in drinking water in excess of 8 µg/L, as calculated from measurements at the outlet of a water treatment plant.

C. Salinity Impacts Resulting from Project Operations

The criteria below will be used in the screening procedures set forth in paragraphs E.2 and E.3 of the WQMP and in the imposition of operational constraints in paragraph E.5 of the WQMP. The criteria are intended to promote Project operations that select the highest water quality for diversion to the islands and minimize salinity impacts associated with discharges from the reservoir islands:

1. Project operations that cause an increase in salinity of more than 10 mg/L chloride at one or more of the urban intakes; or
2. Project operations that cause or contribute any salinity increase at the urban intakes in the Delta exceeding 90% of an adopted salinity standard (e.g., Rock Slough chloride standard defined in SWRCB Decision 1641).

ATTACHMENT 3
INITIAL MODELING ASSUMPTIONS

The screening procedures and long-term mitigation requirements of the Water Quality Management Plan ("WQMP") require several analytical tools to predict water quality and disinfection by-products ("DBP") changes or Total Trihalomethanes ("TTHM"). Three models will be required to implement the WQMP: 1) a water quality model, 2) a particle-tracking model, and 3) a water treatment model for DBPs. The Annual Operating Plan sets forth periodic update and approval requirements of the final modeling program; however, the initial modeling assumptions included in the evaluations for the WQMP have been included below:

1. Initial modeling assumptions
   a. Baseline hydrology: existing conditions and short-term forecasts (50% exceedence) of future conditions
   b. Baseline water quality: Fischer Delta Model Version 10 with real tide simulations

2. Initial land use assumptions
   a. No-Project irrigation and drainage quantities: DWR DICU historic rates
   b. No-Project agricultural drainage quality:
      i. Ag bromide to channel bromide ratio (Ag/Ch Ratio) = max (65.597 * $Ch^{-0.6436}$ or 125%)
      ii. Ag TOC = Average of west and south Delta MWD assumptions

3. TTHM Model (Malcolm Pirnie)

$$TTHM = 7.21 \times TOC^{0.004} \times UVA_{254}^{0.534} \times (Cl_{DOSE} - 7.6 \times NH_3N)^{0.224} \times Cl_{TIME}^{0.255} \times (Br+1)^{2.01} \times (pH-2.6)^{0.719} \times T^{0.48}$$

Where:

TOC = raw water TOC (mg/l) x (0.75 if TOC<4 or 0.65 if TOC>4)

$UVA_{254} = 0.033 \times TOC + 0.010$

Cl_{DOSE} (Cl:TOC ratio) = 1.0

NH_3N = Not Applicable

Cl_{TIME} (contact time) = 1.0 hour

Br = raw water bromide (mg/l)

pH = 7.0

T = Monthly average raw water temperature (9-24°C)

4. Bromate Model (Ozekin)

$BRM = [1.63\ E\text{-}06 \times TOC^{-1.26} \times pH^{5.82} \times O3_{DOSE}^{1.57} \times Br^{0.73} \times O3_{TIME}^{0.28}] \times BRMCF$

Where:

TOC = raw water TOC (mg/l) x (0.75 if TOC<4 or 0.65 if TOC>4)

pH = 7.0

$O3_{DOSE}$ (O3:TOC ratio) = 0.6

Br = raw water bromide (µg/l)

$O3_{TIME}$ (contact time) = 12 minutes

BRMCF (bromate correction factor) = 0.56

Protest Dismissal Agreement Between Contra Costa Water District and Delta Wetlands Properties

CCWD EXHIBIT 25

before the

STATE WATER RESOURCES CONTROL BOARD

STATE OF CALIFORNIA

in the

WATER RIGHTS HEARING FOR THE DELTA WETLANDS PROJECT

October 10-12, 2000

on behalf of the

CONTRA COSTA WATER DISTRICT

PROTEST DISMISSAL AGREEMENT

BETWEEN CONTRA COSTA WATER DISTRICT

AND DELTA WETLANDS PROPERTIES

PROTEST DISMISSAL AGREEMENT
BETWEEN
CONTRA COSTA WATER DISTRICT AND
DELTA WETLANDS PROPERTIES

This Protest Dismissal Agreement is entered into and effective this 9th day of October, 2000, by and among Applicant Delta Wetlands Properties ("DWP") and Protestant Contra Costa Water District ("CCWD" or "District").

RECITALS

WHEREAS:

1. DWP proposes to develop a water storage project, known as the Delta Wetlands Project (hereinafter referred to as the "Project"), in the Sacramento-San Joaquin River Delta ("Delta"), on four islands, all of which are located within the statutory boundary of the Sacramento-San Joaquin River Delta, as defined in Water Code Section 12220, shown on the map attached hereto as Exhibit A.

2. The Project includes diversion and storage of water on two of the Delta islands (Bacon Island and Webb Tract, or "reservoir islands") and seasonal diversion of water to create and enhance wetlands and to manage wildlife habitat on the other two islands (Bouldin Island and Holland Tract, or "habitat islands"), as described in the Water Rights Applications.

3. In pursuit of the Project, DWP filed Water Right Applications 29061, 29062, 29063, and 29066 dated July 1, 1987 and Water Right Applications 30267, 30268, 30269, and 30270 dated July 21, 1993 ("Applications"), with the California State Water Resources Control Board ("SWRCB").

4. CCWD asserts that it is a legal user of water from the Delta and is located entirely within an area enclosed by the statutory boundaries of the Delta or an area immediately adjacent thereto which can conveniently be supplied with water therefrom.

5. CCWD diverts water from the Delta, pursuant to direct diversion and storage rights, for beneficial uses including, but not limited to, municipal, industrial, agricultural, and recreation purposes, under its Water Right License No. 3167 for Mallard Slough, and Water Right Permits for Mallard Slough (No. 19856), Kellogg Creek (No. 20750) and Los Vaqueros Reservoir (No. 20749).

6. CCWD also diverts and rediverts water from the Delta at Rock Slough, Mallard Slough, and Old River for beneficial uses including, but not limited to, municipal, industrial, and agricultural purposes under a Water Service Contract (Amendatory Contract Number I75r-3401 dated May 26, 1994) with the United States Bureau of Reclamation ("USBR") for water from the Central Valley Project ("CVP"). CCWD's CVP contract was further amended on February 7, 2000 (Amended Contract Number I75r-3401A).

7. CCWD owns and operates the Los Vaqueros Project, which includes the Old River Intake, the 100,000 acre-foot Los Vaqueros Reservoir, pumping facilities and pipelines, and which is operated to store water for the purposes of improving CCWD's water quality and emergency supplies while providing net environmental benefits.

8. On January 21, 1988 and October 4, 1993, CCWD filed timely water rights protests to the Applications filed by DWP for the Project, alleging injuries to CCWD, its water rights and the quality of water CCWD diverts from the Delta and based on environmental considerations. CCWD's protests stated that "The Protest could be dismissed provided that conditions that will provide positive assurance that the applicant's project will not adversely affect the quality or quantity of the Protestant's water supplies, or adversely affect the Protestant's ability to meet environmental conditions and mitigation requirements of the Los Vaqueros Project. Conditions for dismissal must also include assurance that operation of applicant/petitioner's project will not adversely affect the water supply operations of the CVP in a manner which would result in impairment of the quantity or quality of water supplied to Protestant by the CVP."

9. Because of the close geographic and hydraulic proximity of the reservoir islands to CCWD's intakes in the Delta, Project operations could lead to increased total organic carbon (TOC), bromide, total dissolved solids (TDS) and/or chloride concentrations in CCWD's drinking water supply.

10. CCWD asserts that, as a legal user of water, it would be injured if water intended for export from the Delta were diverted to storage on the reservoir islands outside of the export/inflow ratio specified in the SWRCB's May 1995 Water Quality Control Plan and Revised Water Rights Decision 1641.

11. Failure of the levee system on DWP islands or neighboring islands as a result of Project operations could, because of the close geographic and hydraulic proximity of the reservoir islands to CCWD's intakes in the Delta, impact CCWD's water quality and water supply by causing increased seawater intrusion, and/or releasing poorer quality stored water from the Delta Wetlands islands into the Delta.

12. An appropriate agreement is necessary to provide protective measures and the requisite degree of certainty regarding the construction, operation, and maintenance of the Project, so that such a sale to another party would not result in the Project being constructed, operated and maintained in a way that would injure CCWD, CCWD's water rights and water quality, and disrupt the operation of the Los Vaqueros Project.

13. CCWD and DWP wish to resolve their differences with respect to the Project in a way that will permanently protect CCWD's interests in water supply, water quality and environmental protection of the Delta insofar as said interests could be affected by the Project, and that would allow withdrawal of the water rights protests CCWD has filed, avoid further dispute as to the adequacy of the Final Environmental Impact Reports and Environmental Impact Statements for the Project, and avoid any other legal, regulatory, or other challenges by CCWD to Project construction, operation, or sale.

14. CCWD, DWP and the California Urban Water Agencies ("CUWA") have participated in extensive efforts to develop a Water Quality Management Plan ("WQMP") for the Project to address the particular water quality issues regarding the Project that raise urban water quality concerns. The elements of the WQMP are intended to provide the urban water utilities with the necessary assurances that the Project will be operated in a manner that will ensure the protection of public health and long-term integrity of drinking water supplies diverted from the Sacramento-San Joaquin Delta, and that the Project, in conjunction with components of the CALFED Bay-Delta Program, will result in net continuous improvement in Delta water quality.

15. CUWA and DWP have executed that certain Agreement to Resolve Certain Delta Wetlands Permit Issues, dated October 9, 2000, which incorporates the WQMP and provides CUWA member agencies, including CCWD, certain other guarantees regarding the avoidance of conflicts with the schedule and funding of CALFED programs, and regarding cost allocation issues should DWP be sold.

16. The intent of this Agreement is to prevent the Project from adversely impacting CCWD. CCWD asserts that because the distinctive features of the Project are unique, this Agreement should not be construed as setting a precedent that would necessarily be applicable to dissimilar projects, or to other actions or activities related to Delta water quality or water supply matters.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing and the mutual and dependent covenants hereinafter set forth, the parties mutually agree as follows:

1. The purpose of this Agreement is to set forth the terms and conditions that if agreed to and adhered to by DWP, its successors and assigns, shall cause CCWD to withdraw its protests against the Water Rights Applications for the Project. CCWD shall withdraw its protest of the Water Rights Applications for the proposed Project based on the terms and conditions of this Agreement and on the condition that the SWRCB expressly includes, in any water rights permits issued for the Project, the terms and conditions set forth in paragraphs 2, 3, 4, 5 and 6 below.

2. DWP will implement and continue to operate the Project according to the WQMP, attached hereto as Exhibit B and incorporated herein by this reference, which addresses the potential impacts of both diversions to and discharges from the DWP islands.

3. DWP agrees that, in order to protect CCWD's water quality, DWP will operate the Project subject to the following restrictions:

   a. Project diversions shall not exceed 1,000 cubic feet per second ("cfs") when the 14-day running average of X2 is greater than 80 km, nor exceed 500 cfs if the 14-day running average of X2 exceeds 81 km. The location of X2 shall be defined as the average daily location of a surface water electrical conductivity (EC) of 2.64 mmhos/cm, determined by interpolating the average daily surface EC measurements at existing Bay-Delta monitoring stations. Should this traditional methodology be replaced, superseded, or become otherwise unavailable, the Project shall follow whatever equivalent practice is developed, subject to mutual agreement.

   b. The Project diversions from the Delta to storage shall not exceed twenty-five percent (25%) of Net Delta Outflow, which Index shall be calculated as defined in the SWRCB May 1995 WQCP as it may be amended or revised from time to time, provided that the Net Delta Outflow shall include in its calculation the diversions of the Project, nor shall Project diversions from the Delta to storage exceed fifteen percent (15%) of Net Delta Outflow in the months of January, February and March, nor shall any diversions to storage be made in April and May, nor shall Project diversions shift the location of X2 by more than 2.5 kilometers ("km") during the months of October, November, December, January, February and March. The resultant shift in X2 shall be determined by a comparison of the modeled estimates of the X2 location, with and without the Project, using a mathematical model, e.g., Kimmerer and Monismith equation.

   c. The Project shall not cause at any time an increase in chloride concentration at any of CCWD's intakes of more than 10 milligrams/liter (mg/l).

   d. The Project shall not undertake its initial diversions to storage for the current water year (commencing October 1) until X2 has been west of Chipps Island for a period of ten (10) consecutive days.

4. DWP agrees that the Project shall not divert to storage if the Delta is in excess conditions and such diversions cause the location of the 14-day running average of X2 to shift upstream (east) such that X2 is:

   a. East of Chipps Island (75 river kilometers upstream of the Golden Gate Bridge) during the months of February through May, or

   b. East of Collinsville (81 kilometers upstream of the Golden Gate Bridge) during the months of January, June, July, and August, or

   c. During December, east of Collinsville and Delta smelt are present at Contra Costa Water District's point of diversion under Water Rights Permits 20749 and 20750.

5. DWP and CCWD agree that any diversion by the Project to storage that causes the Delta to change from excess to balanced conditions shall be junior in priority to Permits 20749 and 20750 of the Contra Costa Water District. Excess conditions and balanced conditions shall be determined by the State Department of Water Resources and the USBR.

6. Because of the close geographic and hydraulic proximity of the reservoir islands to CCWD's intakes in the Delta and CCWD's special concerns regarding salinity, 30 days prior to submitting the annual operating plan as set forth in the WQMP, DWP will provide CCWD a preliminary review draft of the WQMP annual operating plan for review and comment and Delta Wetlands will fully consider in good faith CCWD's comments before submitting it for approval as provided by the WQMP. CCWD will provide its comments within fifteen (15) days and Delta Wetlands shall submit CCWD's comments with its final annual operating plan. Monthly updates to the annual operating plan will be submitted to CCWD in draft form fourteen (14) days in advance of submission to the Project Water Quality Management and Action Board and CCWD will provide comments within seven (7) days.

7. Whether or not the SWRCB includes the terms and conditions set forth in the Protest Dismissal Agreement, DWP shall be subject to and comply with the terms, conditions, and requirements of this Agreement.

8. CCWD and DWP agree that protection of Delta levee systems, including the levee systems on the four islands that are part of the Project, is necessary to protect Delta water quality, and such protection is one purpose of the Protest Dismissal Agreement executed by DWP and East Bay Municipal Utility District ("EBMUD") that became effective on September 13, 2000. A copy of said agreement is attached hereto as Exhibit C and incorporated herein by this reference. DWP agrees that CCWD, as a user of water diverted from the Delta at locations in close geographic and hydraulic proximity to the Project islands, is a third party beneficiary of said EBMUD/DWP Protest Dismissal Agreement.

9. DWP agrees that CCWD, as a member of CUWA, is a third party beneficiary of that certain Agreement to Resolve Certain Delta Wetlands Permit Issues, between CUWA and DWP, dated October 9, 2000, which is attached hereto as Exhibit D and incorporated herein by this reference.

10. This Agreement shall be binding upon and inure to the benefit of the successors in interest and legal representatives of the respective parties.

11. All changes or modifications to this Agreement shall be in writing and signed by CCWD and DWP.

12. The signatories hereto represent that they are authorized to enter into this Agreement on behalf of the party for whom they sign. This document may be executed in duplicate originals.

DELTA WETLANDS PROPERTIES, an Illinois general partnership

Dated: _____ By _____
Anne J. Schneider
ELLISON, SCHNEIDER & HARRIS

CONTRA COSTA WATER DISTRICT

Dated: OCTOBER 9, 2000 By Robert B. Maddow
Robert B. Maddow
BOLD, POLISNER, MADDOW, NELSON & JUDSON

12. The signatories hereto represent that they are authorized to enter into this Agreement on behalf of the party for whom they sign. This document may be executed in duplicate originals.

DELTA WETLANDS PROPERTIES, an Illinois general partnership

Dated: October 9, 2000

By _____
Anne J. Schneider
ELLISON, SCHNEIDER & HARRIS

CONTRA COSTA WATER DISTRICT

Dated: _____

By _____
Robert B. Maddow
BOLD, POLISNER, MADDOW, NELSON & JUDSON

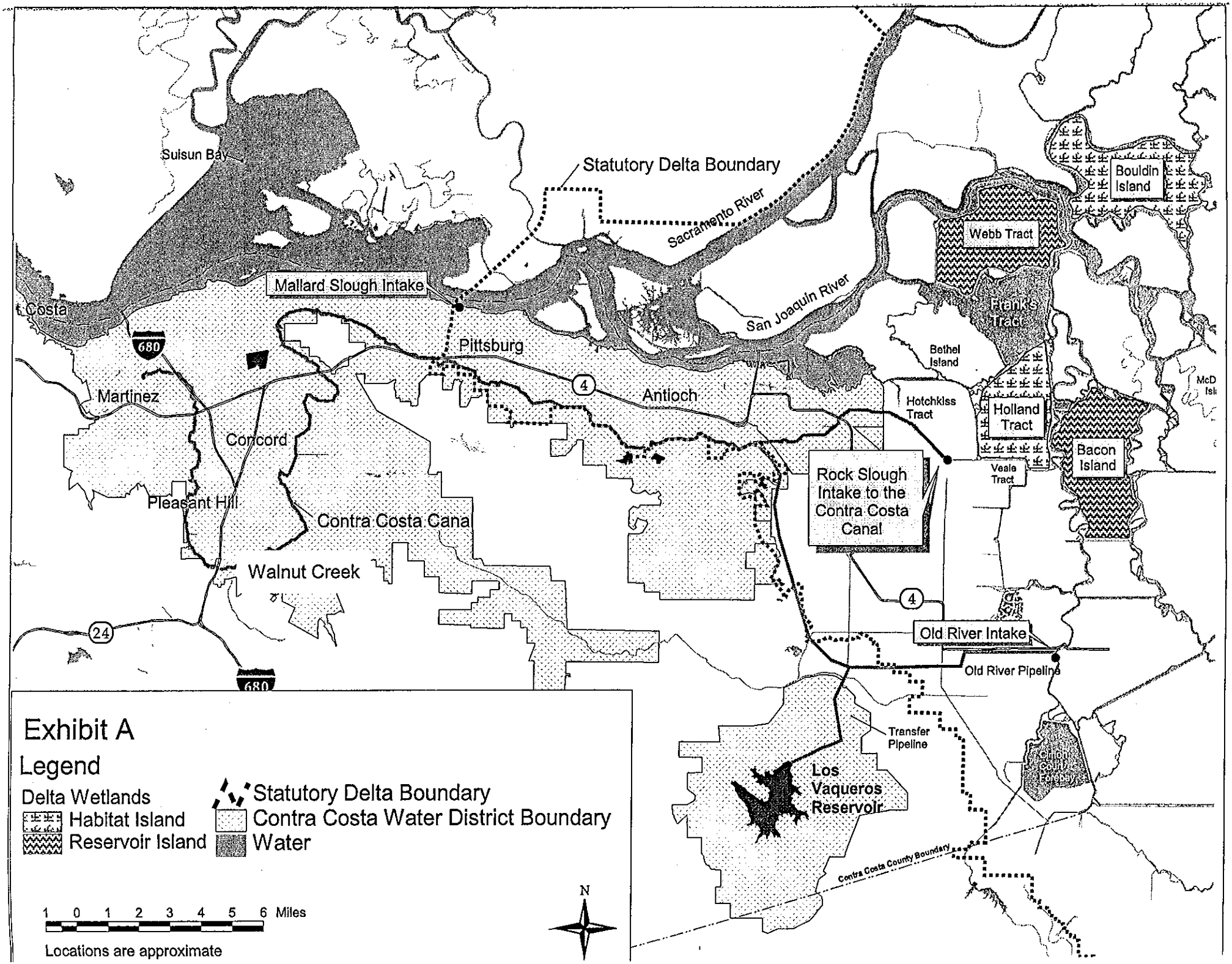
Suisun Bay
Statutory Delta Boundary
Sacramento River
San Joaquin River
Mallard Slough Intake
Pittsburg
Antioch
Martinez
Concord
Pleasant Hill
Contra Costa Cana
Walnut Creek
Rock Slough Intake to the Contra Costa Canal
Old River Intake
Old River Pipeline
Transfer Pipeline
Los Vaqueros Reservoir
Contra Costa County Boundary
Bouldin Island
Webb Tract
Bethel Island
Hotchkiss Tract
Holland Tract
Veale Tract
Bacon Island
680
4
24
Exhibit A
Legend
Delta Wetlands
Habitat Island
Reservoir Island
Statutory Delta Boundary
Contra Costa Water District Boundary
Water
1 0 1 2 3 4 5 6 Miles
Locations are approximate
N

EXHIBIT B

WATER QUALITY MANAGEMENT PLAN

October 9, 2000

Preamble

Delta Wetlands Properties ("DW") proposed a water storage project on four islands in the Sacramento-San Joaquin Delta ("Delta"). The project would involve diverting and storing water on two of the islands (Bacon Island and Webb Tract, or "reservoir islands") and seasonally diverting water to create and enhance wetlands and to manage wildlife habitat on the other two islands (Bouldin Island and Holland Tract, or "habitat islands").

The purpose of the Delta Wetlands Project ("Project") is to divert surplus Delta inflows, transferred water or banked water for later sale and/or release for Delta export or to meet water quality or flow requirements for the Delta. To operate the Project, DW would strengthen the levees and install additional siphons and water pumps on the perimeters of the reservoir islands. The Project is undergoing environmental review (CEQA and NEPA), water rights permitting (State Water Resources Control Board), and an appraisal level study of the Project by the U.S. Bureau of Reclamation ("USBR").

California Urban Water Agencies[1] ("CUWA") and its member agencies have been participating in the public review of the Project since 1997 and are parties to the water rights proceedings for the Project. The primary focus of CUWA's participation in the review of the Project has been to seek a commitment from the Project proponents to minimize and mitigate drinking water quality impacts due to Project operations. Because of the close proximity of the reservoir islands to the Banks Pumping Plant, Tracy Pumping Plant, Contra Costa Canal at Pumping Plant #1, Contra Costa Water District's ("CCWD") Los Vaqueros intake on Old River and CCWD's Mallard Slough intake (hereafter "urban intakes"), CUWA is concerned that there is a potential for DW operations to result in increased total organic carbon ("TOC"), bromide, total dissolved solids ("TDS"), and chloride concentrations in urban water supplies.

In an effort to address CUWA's water quality concerns, Delta Wetlands Properties proposes to implement a water quality management plan ("WQMP"). The WQMP includes drinking water quality protection principles, an annual operating plan, general operating principles, a comprehensive monitoring program, screening procedures and operational constraints, and mitigation of water quality impacts. Collectively, the elements of the WQMP are intended to provide the urban water utilities with the necessary assurances that the Project will be operated in a manner that will ensure the protection of public health and long-term integrity of drinking water supplies diverted from the Sacramento-San Joaquin Delta.

The WQMP was developed through a negotiated process to resolve issues that are specific to the Project. The terms and conditions of the WQMP are intended to address the potential for injury to senior water rights holders associated with water quality degradation caused by the Project.

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[1] All references to CUWA shall mean CUWA, its current member agencies and those member agencies of record as of the date of this agreement.

The impacts caused by the Project are unique because of its proximity to urban water agencies' intakes and the high rates of discharge from the reservoir islands. The Project, without the protections provided by the WQMP, has the potential to adversely impact human health by increasing disinfection by-products ("DBP") and to increase the overall cost of water utility operations. The Project could also lead to long-term degradation in drinking water quality. Because the WQMP includes distinctive features that are specific to DW, it should not be construed as setting a precedent that would be applicable to other dissimilar projects subject to State Water Resources Control Board jurisdiction.

A. Drinking Water Quality Protection Principles

The Project will adhere to the drinking water quality protection principles described below through the implementation of the terms and conditions of this WQMP.

1. Project operations shall cause no adverse health impacts to water users;

2. Project operations shall not cause nor contribute to non-compliance with current or future drinking water regulations;

3. Project operations shall cause no increases in the cost of water treatment or operations;

4. Project operations shall contribute to CALFED's progress toward achieving continuous improvement of Delta drinking water source quality; and

5. Project operations shall minimize and mitigate for any degradation in the quality of drinking water supplies.

B. Water Quality Management and Action Board and Annual Operating Plan

The Water Quality Management and Action Board and the Annual Operating Plan outlined below are intended to support the administration and implementation of the WQMP.

1. Prior to initiating or continuing Project operations, a Water Quality Management and Action Board ("WQMAB") shall be appointed to oversee the implementation of the WQMP for the Project subject to the procedures, duties and requirements set forth in Attachment 1.

2. Prior to February 15 of each year, DW will propose an Annual Operating Plan for approval by the WQMAB. The Annual Operating Plan will be updated monthly and coordinated with Central Valley Project, State Water Project, and CCWD operations. The Annual Operating Plan will include:

   a. Schedules and estimated quantities for diversions to the Project islands and discharges from the Project islands.

   b. Water quality goals and objectives, including the estimated concentration of TOC, bromide, chloride, and TDS for the diversions to the Project islands and discharges from the Project islands.

c. An estimate of the projected change in the concentration of TOC, bromide, chloride, and TDS at the urban diversion locations due to scheduled Project operations.

d. Maximum allowable concentrations of the water quality constituents of concern (TOC, bromide, TDS, and chloride) for water stored on the reservoir islands, above which it will be necessary for DW to pursue remedial actions pursuant to the Emergency Operating Plan. The maximum allowable concentrations are upper limits above which discharge of water from the reservoir islands may cause a violation of one or more of the drinking water quality protection principles.

e. An Emergency Operating Plan describing remedial actions to be taken by DW in the event the water stored on the reservoir islands exceed the maximum allowable concentrations for the constituents of concern, including a procedure for discharge of the water from the reservoir islands that will minimize the potential for impacts to urban water utilities.

f. A schedule for habitat island operations, including diversion and discharge rates.

g. A schedule for reservoir island operations for non-storage periods.

h. A description of the monitoring program, hydrodynamic models, and particle-tracking models pursuant to Section D.

i. A description of mitigation measures to be implemented by DW to offset any long-term net increase in TOC, TDS, bromide or chloride loading pursuant to Section F.

C. General Operating Principles

The general operating principles outlined below are intended to support implementation of the WQMP.

1. To maintain low TOC, bromide and salinity levels to the fullest extent practicable, DW will:

   a. Avoid practices that will result in high TOC productivity during non-storage periods;

   b. Avoid diversions to storage during peak TOC periods;

   c. Avoid diversions to storage during high bromide and high salinity periods; and

   d. Manage vegetative growth on the reservoir islands to minimize TOC production.

2. To avoid degradation in water quality at the urban intakes in the Delta, DW will develop operational procedures to:

   a. Reduce the rate of discharge from the reservoir islands as appropriate;

b. Coordinate discharges between reservoir islands; and

c. Adjust discharges for exports in accordance with Delta hydrodynamic (e.g., tides, pulse flows).

3. To avoid excessive TOC, bromide and salinity levels, DW will:

a. Pursue remedial actions or acquire offsets before initiating further diversions to storage if TOC, bromide or salinity concentrations on reservoir islands regularly exceed 80% of the maximum allowable concentrations set forth in the Annual Operating Plan.

D. Comprehensive Monitoring Program

The comprehensive monitoring program outlined below will be developed and in place prior to initiating Project operations. The monitoring program provides for the collection of data to support the screening of Project operations and for imposition of operational constraints pursuant to Section E and the identification of mitigation requirements pursuant to Section F.

1. DW will conduct real-time water quality monitoring on the reservoir and habitat islands and in the Delta channels at the discharge locations of the reservoirs and habitat islands prior to and during all discharge periods.

2. The State Department of Water Resources ("DWR"), USBR and CCWD will provide real-time water quality monitoring data at urban intakes in the Delta.

3. The owners of urban water treatment facilities will provide water quality monitoring and operational data at water treatment plants.

4. The water quality monitoring program shall include quality assurance and quality control provisions.

5. Monitoring parameters will include TOC, bromide, TDS, chloride, UVA, DO, turbidity, and temperature.

6. DW will post monthly summaries of the data collected pursuant to subsections 1 through 3 above on the DW web site or adopt an alternative means of disseminating this information to the WQMAB and interested parties that provides an equivalent degree of accessibility.

7. Hydrodynamic and particle-tracking models will be used to predict both baseline conditions (without Project) and real-time changes at the urban intakes in the Delta prior to, during and after a Project operation. DW will submit a proposed monitoring and modeling program for approval by the WQMAB prior to operating the reservoir islands with annual updates and approvals of the modeling program thereafter (through the Annual Operating Plan review process) to reflect advances in science and technology.

Water quality constituent predictions required by the WQMP shall be calculated in accordance with the initial models and modeling assumptions set forth in Attachment 3, unless otherwise approved by the WQMAB.

E. Screening Procedures and Operational Constraints to Prevent Short-Term Impacts

The process outlined below for screening of Project operations and imposition of operational constraints is intended to prevent short-term impacts to urban water utilities and to ensure adherence to the drinking water quality protection principles 1 through 3 set forth in Section A.

1. Operational screening criteria will be used to identify Project operations that may threaten adherence to one or more of the drinking water quality protection principles. The operational screening criteria are set forth in Attachment 2 and implemented as described below.

2. Prior to DW initiating each diversion to the reservoir islands and each discharge from the reservoir islands and weekly thereafter during continuing diversions and discharges, the hydrodynamic and particle-tracking models will be used to predict whether Project operations (including operations of the habitat islands) are likely to exceed one or more of the operational screening criteria at the urban intakes in the Delta. (See Attachment 2, criteria A1, A2, B1, B2, C1, and C2.)

3. If the model output indicates that Project operations may exceed one or more of the operational screening criteria at one or more of the urban intakes in the Delta, DW will conduct further studies (prior to initiating a diversion to the reservoir islands or a discharge from the reservoir islands) to determine whether one or more of the drinking water quality protection principles would be threatened at an urban water treatment plant. (See Attachment 2, criteria A3, B3, and B4.)

4. If, upon further study, it appears that Project operations may threaten one or more of the drinking water protection principles at an urban water treatment plant, a determination will be made whether the threat would be offset by a Project-induced water quality or water supply improvement. If the owner of the impacted water treatment plant agrees that the threat would be offset or agrees to waive its right to protection under the WQMP, DW may initiate the diversion to the reservoir islands or discharge from the reservoir islands.

5. If Project operations threaten a drinking water quality protection principle at the water treatment plant without offsetting benefits and the treatment plant owner has not waived its right to protection, Project operations will be reduced, rescheduled or otherwise constrained as necessary to prevent the impact from occurring.

6. If an urban water treatment plant owner presents a complaint to DW and the WQMAB that: (1) a violation of a drinking water quality protection principle has occurred or is likely to occur in the absence of remedial action, or (2) one of the Project screening criteria set forth in Attachment 2 has been exceeded or is likely to be exceeded in the absence of remedial action, and (3) the WQMAB finds that the complaint has sufficient

merit to warrant an investigation; the WQMAB shall proceed with an investigation of the complaint. Throughout the duration of the WQMAB's investigation of the complaint and until the matter is resolved by the WQMAB, Project operations shall be restricted such that the maximum discharge rate from a reservoir island shall not exceed the schedule set forth in Table 1. Alternatively, the Project operations may proceed pursuant to the terms of an Emergency Operating Plan that has been approved by the WQMAB. DW shall cooperate with the WQMAB throughout the duration of the investigation.

7. If the WQMAB pursuant to the investigations set forth in paragraph E.6 make a finding that monitoring, modeling, and/or operational constraints fail to prevent a violation of a drinking water quality protection principle resulting from Project operations, or fail to prevent an exceedance of one of the operational screening criteria set forth in Attachment 2 due to Project operations, the WQMAB shall require DW to initiate emergency operations or take remedial actions to correct the problems.

Table 1[1]

TOC Concentration on Bacon Island Minus That of Ambient Water (mg/L)[2]	Maximum Discharge Rate from Bacon Island (cfs)[2]	TOC Concentration on Webb Tract Minus That of Ambient Water (mg/L)	Maximum Discharge Rate from Webb Tract (cfs)[2]	Chloride Concentration on a Reservoir Island (mg/L)	Maximum Combined Discharge Rate from Bacon Island and Webb Tract (cfs)[2]
0 to 1.0	1,500	0 to 3.0	1,500	0 to 50	3,000
1.1 to 2.0	1,250	3.1 to 4.0	1,250	51 to 70	2,500
2.1 to 3.0	1,000	4.1 to 5.0	1,000	71 to 90	2,000
3.1 to 4.0	750	5.1 to 6.0	750	91 to 110	1,500
4.1 to 5.0	500	6.1 to 7.0	500	111 to 130	1,000
5.1 to 6.0	250	7.1 to 8.0	250	131 to 150	500
6.1 to 7.0	125	8.1 to 9.0	125	151 to 170	250
Greater than 7.0	40	Greater than 9.0	40	171 to 250	80

Table 1 footnotes:

[1] The restrictions on discharges from the reservoir islands contained in Table 1 for various concentrations of TOC and chloride are not applicable if the TOC and chloride concentrations on a reservoir island are less than or equal to the average TOC and chloride measured in the channels adjacent to the reservoir islands for the 7-day period prior to initiating the discharge.

[2] The maximum discharge rate means the average discharge rate over a 14-day period or the duration of the discharge, whichever time period is less. The maximum discharge rate shall be further constrained, as necessary, to limit the total contribution from the reservoir islands at the urban intakes to 25% of the combined export pumping at the Banks and Tracy pumping plants.

F. Mitigation of Long-Term Water Quality Impacts.

The process outlined below for mitigation of long-term water quality impacts due to Project operations is intended to prevent long-term impacts to urban water utilities and ensure adherence to the drinking water quality protection principles 3 and 4 set forth in Section A. Should Project operations produce a long-term net increase in TOC, TDS, bromide or chloride loading in the urban diversions, mitigation may be necessary, as described below:

1. During the course of the 12-month operating plan, DW shall maintain a running account of the changes in TOC, TDS, bromide and chloride in the water diverted from the Delta for urban use due to Project operations.

2. Once every three years, DW shall submit an accounting of the net increase or decrease in TOC, TDS, bromide and chloride loading in the water diverted from the Delta for urban use due to Project operations (including habitat island operations).

3. DW shall be required to acquire offsets or otherwise mitigate 150% of the net increase in TOC, TDS, bromide and chloride loading greater than 5% in the urban diversions due to Project operations.

4. DW must acquire the offsets or complete the mitigation at its expense within 24 months after the submission of the accounting set forth in 2 above. Any offset or mitigation that is provided in the current accounting period that is due to a mitigation requirement that accrued during a previous accounting period shall be excluded from the calculation of the net increase for the current accounting period.

5. In recognition of initial Project start-up, long-term mitigation requirements for TOC loading shall be waived for the first year of reservoir operation; however, the screening procedures and operational constraints to prevent short-term impacts set forth in Section E shall still apply.

ATTACHMENT 1
WATER QUALITY MANAGEMENT AND ACTION BOARD

1. **Purpose**: A Water Quality Management and Action Board ("WQMAB"), or an equivalent mutually acceptable authority, shall be appointed to oversee the implementation of the Water Quality Management Plan ("WQMP") for the Delta Wetlands Project ("Project").

2. **Members**:

   a. **Qualifications**: The three members and three alternates shall be registered professional engineers, public health professionals or scientists possessing a thorough understanding of Delta operations and recognized for their expertise in organic and inorganic water chemistry and drinking water treatment.

   b. **Appointment Process**: The State Water Resources Control Board ("SWRCB"), California Urban Water Agencies ("CUWA"), and Delta Wetlands Properties ("DW") shall each appoint one member and one alternate. Each prospective member of the WQMAB shall be required to disclose any past or current conflicts of interest that may affect their ability to serve as impartial members of the WQMAB. Appointment of prospective members with past or current conflicts of interest must be approved by the mutual consent of CUWA and DW. In the event that the SWRCB does not appoint its member or alternate to the WQMAB, CUWA and DW shall appoint the SWRCB's member or alternate member. Each of the WQMAB members shall be appointed for a term of four years. At the end of the 4-year term, the same selection process will be used to select the new WQMAB.

3. **Term**: The WQMAB shall be established prior to the first diversions to storage on Bacon Island or Webb Tract ("initial operations") and shall continue thereafter for the duration of Project reservoir operations.

4. **Compensation**: Members of the WQMAB are to be compensated by DW for their time on an hourly basis. Such costs, including costs of reports which may be prepared and studies which may be undertaken by the WQMAB shall be part of the annual operation and maintenance costs of the Project.

5. **Duties**:

   a. The WQMAB shall serve as a neutral water quality advisory panel, hearing and investigating formally identified problems purportedly caused by Project reservoir operations, including but not limited to nonconformance with the Annual Operating Plan and violations of the Drinking Water Quality Protection Principles.

   b. Prior to initial operations and annually thereafter, DW shall submit a proposed Annual Operating Plan for approval by the WQMAB pursuant to Section B of the WQMP.

i. Prior to approving the Annual Operating Plan, the WQMAB shall provide an opportunity to comment on the draft Annual Operating Plan to the SWRCB, CUWA, and all other parties who have notified the WQMAB of their interest to comment on the draft Annual Operating Plan ("Interested Parties").

ii. In the event of any objection by CUWA or an Interested Party, the WQMAB may only approve the Annual Operating Plan after holding a noticed hearing on the proposed operating plan.

iii. If the WQMAB approves the Annual Operating Plan, the WQMAB shall immediately so advise DW.

iv. If the WQMAB does not approve an Annual Operating Plan, the WQMAB shall, within 10 days, provide a report explaining its decision to DW and to the Executive Director of the SWRCB. DW may provide a response to the WQMAB report to the Executive Director.

v. The issue of adequacy of the Annual Operating Plan will be decided by the Executive Director of the SWRCB as soon as possible upon receipt of such report.

vi. If the WQMAB does not approve the Annual Operating Plan for any reason, DW may continue its reservoir operations pursuant to the previously approved Annual Operating Plan or pursuant to paragraph E.6 of the WQMP, if applicable.

c. DW shall make available water quality monitoring and modeling data to the WQMAB pursuant to Sections D and E of the WQMP.

d. During the first two years following initial operations, the WQMAB shall review water quality monitoring data at each stage of filling and discharge of the reservoir islands.

e. At the end of the third year of operations and every three years thereafter, DW shall submit to the WQMAB an accounting of the net increase or decrease in water quality parameters of concern in the water diverted from the Delta for urban use due to Project operations pursuant to Section F of the WQMP. Prior to initiating the fourth year of operations and each year thereafter, the Annual Operating Plan shall include a plan to offset or otherwise mitigate any net increase in water quality parameters of concern pursuant to Section F of the WQMP.

f. If the WQMAB determines that the Project operations are not in conformance with the Annual Operating Plan, the WQMAB shall require the permittee to initiate emergency operations or take remedial actions to correct problems as provided for in paragraph E.7 of the WQMP.

g. The terms of the WQMP may be adjusted over time by the SWRCB as set forth below. The SWRCB reserves jurisdiction over changes in the WQMP to coordinate or modify its terms for the protection of other legal users of water and the public interest as future

conditions may warrant. The SWRCB delegates authority to the Executive Director of the SWRCB to take actions under this reservation of jurisdiction as set forth below.

i. During the third year of Project operations, the WQMAB shall review the WQMP to determine if changes in any of the WQMP terms are advisable. In its review, the WQMAB shall examine actual operation of the Project to date and any adverse effects of Project reservoir operations, including impacts to urban water agencies, degradation of drinking water quality, overall progress toward achieving continuous improvement of drinking water source quality, and any recent changes in state and federal drinking water regulations. The WQMAB will base each of its recommended changes to WQMP terms, if any, on its independent, professional judgment. At the conclusion of its review, the WQMAB shall issue a written list of its recommended changes, if any. The list shall be sent by the WQMAB to the SWRCB, DW, CUWA, and all other Interested Parties.

ii. If no party raises a reasonable objection to a change recommended by the WQMAB within 30 days of service of any proposed change, then the Executive Director of the SWRCB may approve the change without the need for a comment period or hearing. In the event of any objection, the SWRCB may only approve the change after it provides notice of and an opportunity to comment on the proposed change. If requested by an DW, CUWA, or any Interested Party, the SWRCB may hold a hearing on the proposed change.

h. After its initial 3-year review of the WQMP as set forth above, the WQMAB may thereafter periodically review and change the terms of the WQMP so long as the SWRCB review and approval process set forth above is followed.

ATTACHMENT 2
OPERATIONAL SCREENING CRITERIA

Operational Constraints

The operational screening criteria outlined in this attachment were developed to support the process outlined in Section E of the Water Quality Management Plan ("WQMP") for screening of Delta Wetlands Project ("Project") operations and imposition of operational constraints. This process is intended to support Delta Wetlands' ("DW") adherence to the drinking water quality protection principles 1 through 3 described in Section A of the WQMP.

These screening criteria are based on existing state and federal standards for disinfection by-products and their precursors. Should drinking water DBPs, contaminants or precursors, or any other drinking water contaminants be further regulated under state or federal law, the WQMAB shall recommend that the SWRCB amend the screening criteria to ensure that the intent of the drinking water quality protection principles continues to be met.

Evaluation of Project operations using these screening criteria will be based on real-time field measurements and computer modeling results, both of which are subject to uncertainties. For purposes of determining whether the Project has caused an exceedance of one or more of the operational screen criteria, an uncertainty of ±5% of the screening criteria will be assumed.[2] Should greater precision in measurements and calculations be developed, the improved level of confidence will be used as appropriate for each individual parameter.

An exceedance of the operational screening criteria set forth in Sections A, B and C below shall be calculated as a 14-day average, or the average for duration of the discharge, whichever time period is less.

A. TOC Loading

The criteria below will be used in the screening procedures set forth in paragraphs E2 and E3 of the WQMP and in the imposition of operational constraints in paragraph E5 of the WQMP. The criteria are intended to prevent an impact due to Project-related TOC loading that may cause an increase in water treatment costs.

1. Project operations that cause an increase in TOC of more than 1.0 mg/L at the urban intakes; or

2. Project operations that cause TOC concentrations at the urban intakes to exceed 4.0 mg/L; and

[2] An uncertainty of ±5% shall mean that an exceedance of an operational screen criteria does not occur until the Project causes the following values to be exceeded: condition A.1 not applicable; conditions A.2 and A.3 = 0.2 mg/L TOC; conditions B.1 and B.3 = 3.2 µg/L TTHM; conditions B2 and B4 = 0.4 µg/L bromate; conditions C1 and C2 not applicable.

3. Project operations that cause TOC concentrations at a water treatment plant to exceed 4.0 mg/L.

B. DBP Formation

The criteria below will be used in the screening procedures set forth in paragraphs E.2 and E.3 of the WQMP and in the imposition of operational constraints in paragraph E.5 of the WQMP. The criteria are intended to prevent an impact due to Project-related DBP precursor loading that may cause health impacts to water users or may cause or contribute to a water treatment plant violation of a health regulation:

1. Project operations that cause or contribute to modeled Total Trihalomethanes ("TTHM") concentrations in drinking water in excess of 64 µg/L, as calculated in the raw water of an urban intake in the Delta;
2. Project operations that cause or contribute to modeled bromate concentrations in drinking water in excess of 8 µg/L, as calculated in the raw water of an urban intake in the Delta;
3. Project operations that cause or contribute to predicted TTHM concentrations in drinking water in excess of 64 µg/L, as calculated from measurements at the outlet of a water treatment plant; or
4. Project operations that cause or contribute to predicted bromate concentrations in drinking water in excess of 8 µg/L, as calculated from measurements at the outlet of a water treatment plant.

C. Salinity Impacts Resulting from Project Operations

The criteria below will be used in the screening procedures set forth in paragraphs E.2 and E.3 of the WQMP and in the imposition of operational constraints in paragraph E.5 of the WQMP. The criteria are intended to promote Project operations that select the highest water quality for diversion to the islands and minimize salinity impacts associated with discharges from the reservoir islands:

1. Project operations that cause an increase in salinity of more than 10 mg/L chloride at one or more of the urban intakes; or
2. Project operations that cause or contribute any salinity increase at the urban intakes in the Delta exceeding 90% of an adopted salinity standard (e.g., Rock Slough chloride standard defined in SWRCB Decision 1641).

ATTACHMENT 3
INITIAL MODELING ASSUMPTIONS

The screening procedures and long-term mitigation requirements of the Water Quality Management Plan ("WQMP") require several analytical tools to predict water quality and disinfection by-products ("DBP") changes or Total Trihalomethanes ("TTHM"). Three models will be required to implement the WQMP: 1) a water quality model, 2) a particle-tracking model, and 3) a water treatment model for DBPs. The Annual Operating Plan sets forth periodic update and approval requirements of the final modeling program; however, the initial modeling assumptions included in the evaluations for the WQMP have been included below:

1. Initial modeling assumptions
   a. Baseline hydrology: existing conditions and short-term forecasts (50% exceedence) of future conditions
   b. Baseline water quality: Fischer Delta Model Version 10 with real tide simulations

2. Initial land use assumptions
   a. No-Project irrigation and drainage quantities: DWR DICU historic rates
   b. No-Project agricultural drainage quality:
      i. Ag bromide to channel bromide ratio (Ag/Ch Ratio) = max ($65.597 * Ch^{-0.6436}$ or 125%)
      ii. Ag TOC = Average of west and south Delta MWD assumptions

3. TTHM Model (Malcolm Pirnie)

$$TTHM = 7.21 \times TOC^{0.004} \times UVA_{254}^{0.534} \times (Cl_{DOSE} - 7.6 \times NH_3N)^{0.224} \times Cl_{TIME}^{0.255} \times (Br+1)^{2.01} \times (pH-2.6)^{0.719} \times T^{0.48}$$

Where:

TOC = raw water TOC (mg/l) x (0.75 if TOC<4 or 0.65 if TOC>4)

$UVA_{254} = 0.033 \times TOC + 0.010$

Cl_{DOSE} (Cl:TOC ratio) = 1.0

NH_3N = Not Applicable

Cl_{TIME} (contact time) = 1.0 hour

Br = raw water bromide (mg/l)

pH = 7.0

T = Monthly average raw water temperature (9-24°C)

4. Bromate Model (Ozekin)

$BRM = [1.63\ E\text{-}06 \times TOC^{-1.26} \times pH^{5.82} \times O3_{DOSE}^{1.57} \times Br^{0.73} \times O3_{TIME}^{0.28}] \times BRMCF$

Where:

TOC = raw water TOC (mg/l) x (0.75 if TOC<4 or 0.65 if TOC>4)

pH = 7.0

$O3_{DOSE}$ (O3:TOC ratio) = 0.6

Br = raw water bromide (µg/l)

$O3_{TIME}$ (contact time) = 12 minutes

BRMCF (bromate correction factor) = 0.56

Exhibit C

Protest Dismissal Agreement Between
Delta Wetlands Properties and
East Bay Municipal Utility District

A copy of this agreement is contained elsewhere in this Appendix